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How We Do It: Solar-powered mixing in Iola, Kan.

**PAGE 40** 

DEDICATED TO MUNICIPAL WASTEWATER PROFESSIONALS

www.tpomag.com JUNE 2014

## Tech Talk: Understanding retention times PAGE 34

Jamie Belden Public Works Superintendent Rose Hill, Kan.

# More Than Clean Water

THE ROSE HILL RESOURCE MANAGEMENT FACILITY ADDS DIVERSE RECYCLING TO ITS CLEAN-WATER ROLE

PAGE 14

Let's Be Clear: A phosphorus cure?

PAGE 8

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## advertiser index .II INF 2014

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<u>(A)</u>	INFILCO INFILCO DEGREMONT 11
Aerzen USA 21	JDVE quipment Corporation
AllMax Software, Inc 41	KellerAmerica
Analytical Technology, Inc 19	Komline-Sanderson         53           Komline-Sanderson         53
Environmental BioTriad Environmental, Inc 49	Kuba North America Ina 19
Blue-White Industries 4	NETZSCH NETZSCH Pumps North
Boerger, LLC 8	America, LLC 33
Bohn Biofilter 35	OMI Industries 5
CST Industries 17	OVIVO
Eagle Microsystems 11	Ovivo USA, LLC 3
CA.	PRD Tech, Inc 25
Environmental Dynamics	PVS Technologies 37
International 13	USABlueBook 56
FLO TREND	<b>®. Vaughan</b>

a a land, live		
Flo Trend Systems, Inc	4	
Grace Industries, Inc	41	
HACH		
Hach Company	2	

## FILCO FILCO DEGREMONT ...... 11 JDV Equipment Corporation OV Equipment Corporation ...... 45 X eller America Inc. ..... 27 Komline-Sanderson omline-Sanderson ..... 53 (UIII)> ETZSCH ETZSCH Pumps North America, LLC ..... 33 MI Industries ..... 5 VIVO vivo USA, LLC ..... 3 RD Tech, Inc. ..... 25 /S Technologies ...... 37 SABlueBook ..... 56 Vaughan Venturi Aeration ...... 53

CLASSIFIEDS	 55

in

YSI, a Xylem brand ...... 37

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#### June 2014

## contents features

**14** TOP PERFORMER – PLANT: MORE THAN CLEAN WATER The Rose Hill Resource Management Facility lives up to its name by adding household recycling, tree farming and more to production of clean water and biosolids.

By Steve Frank, APR, WEF Fellow

## **20** GREENING THE PLANT: SAME TREATMENT QUALITY, LESS ENERGY

A Mississippi plant copes with high flows from two poultry plants with a new SCADA system and automated control over dissolved oxygen. By Doug Day

**22** TOP PERFORMER – OPERATOR: ACE TROUBLESHOOTER Gary Hanson doubles as an operations specialist for a global consulting firm and superintendent of a tiny utility. Both profit from his problemsolving skills.

By Jack Powell

**26** PLANTSCAPES: BEST FACE FORWARD

Jack-o'-lanterns carved from pumpkins grown at the treatment plant and fertilized with biosolids help make a point to kids in a South Dakota town. By Jeff Smith

**28** TOP PERFORMER – BIOSOLIDS: PROUD HISTORY, EXCITING FUTURE

Millions in federal stimulus-funded projects help Austin enhance its respected biosolids program and prepare for transformation to broader resource recovery.

By Ted J. Rulseh

- 34 TECH TALK: MCRT, SRT, DSRT: WHAT'S IT ALL ABOUT? Understanding these "alphabet soup" parameters can help you maintain better control of an activated sludge treatment process. By Ron Trygar, CET
- **36** IN MY WORDS: EXCITING TIMES

The Water Environment Federation's new executive director gives high priority to raising awareness of the importance of infrastructure and the value of water professionals. By Ted J. Rulseh

40 HOW WE DO IT: MIXING MASTERY

Solar-powered mixers help a small lagoon treatment plant meet BOD and TSS limits, solve short-circuiting problems and minimize nuisance odors. By Patrick J. Schnaidt

**49** HOW INGENIOUS ARE YOU?

WEFTEC wants to showcase clean-water operators' clever money-saving, labor-saving, performance-boosting ideas. By Ted J. Rulseh

## COMING NEXT MONTH: JULY 2014

Product Focus: Pumps, Drives, Valves and Blowers

- Top Performer Plant: Hitting the curveballs in Attleboro, Mass.
- Top Performer Plant: Facility revitalization in Cohasset, Mass.
- Top Performer Plant: Continuous improvement in Willis, Texas.
- How We Do It: Real-time nitrogen control in Grand Rapids, Mich.
- Sustainable Operations: Fuel cell trigeneration in Orange County, Calif.
- In My Words: Biosolids: What's all the fuss?
- PlantScapes: Poplar plantation in Woodburn, Ore.









## departments

- 8 LET'S BE CLEAR: OF (SACRED) COWS AND PHOSPHORUS It's time to embrace the fact that point sources are no longer the biggest contributors to nutrients in our waterways — and to start acting accordingly.
   By Ted J. Rulseh, Editor
- **9** THE FIRE CHIEF PROJECT: I HEREBY PROCLAIM By Ted J. Rulseh
- **10** LETTERS
- **12** @TPOMAG.COM Visit daily for news, features and blogs. Get the most from *TPO* magazine.
- 42 PRODUCT FOCUS: ODOR CONTROL AND DISINFECTION By Craig Mandli
- **46** CASE STUDIES: ODOR CONTROL AND DISINFECTION By Craig Mandli
- **50** PRODUCT NEWS Product Spotlight: NEMA 4X meters keep critical data in clear view By Ed Wodalski
- 52 CONTRACTS & AWARDS
- **53** INDUSTRY NEWS
- 54 WORTH NOTING

## on the cover

Jamie Belden and the team at the Rose Hill (Kan.) Resource Management Facility do much more than reclaim the city's wastewater. The plant incorporates a single-stream recycling center, a tree farm, and a green-waste composting facility. (Photography by Ed Zurga)



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## Of (Sacred) Cows and Phosphorus

IT'S TIME TO EMBRACE THE FACT THAT POINT SOURCES ARE NO LONGER THE BIGGEST CONTRIBUTORS TO NUTRIENTS IN OUR WATERWAYS — AND TO START ACTING ACCORDINGLY

By Ted J. Rulseh, Editor



n a canoe trip down a river near my hometown, my brother and I encountered something that to this day still upsets me. On a remote stretch, a farmer had strung electrified fence across the river.

The worst part was not that he had obstructed navigation and we had to worm our way under the fence. No, the worst was that he was treating the river as part of his pasture. Cows could cross back and forth freely, surely at times dumping pies and urine in the water.

I think of this whenever the topic of phosphorus pollution comes up, as it has recently in Wisconsin. There recently was a proposal to re-

write the state's phosphorus rules so that clean-water plants and industries wouldn't have to bear the brunt of phosphorus cleanup, while they account for a small fraction (some say perhaps 2 percent) of the phosphorus load to the waterways.

#### ALTERNATIVE PLAN

This proposal would have allowed point-source dischargers to avoid spending millions of dollars to upgrade treatment plants and instead contribute to a fund that would enable counties to fund upstream runoff management practices that would curtail phosphorus. In general, clean-water agencies and businesses supported this, and conservation groups such as Wisconsin Lakes (of which, by way of disclosure, I am a member), opposed it.

In the end, a compromise was reached. The details of it aren't important in this context. My point here is not to argue the merits of this specific proposal but to suggest that we as a society need to face up to where most phosphorus in our lakes and streams is coming from. It's from runoff, both urban and rural. Stricter stormwater regulations are making a dent in the urban runoff, but far less is being done out in the country.

Farms — poorly managed ones anyway — are big sources of nutrient pollution. We all know it. But we don't do much to mitigate it. Why? Well, for one thing, because doing so would be cumbersome and expensive. But another and perhaps bigger reason is that no one wants to beat up on farmers.

I don't either. Farmers are in a difficult business where investments in runoff prevention likely take a back seat to worrying about whether the next hailstorm will wipe out their crop or a crash in milk or grain prices will threaten their solvency.

#### A DIFFERENT APPROACH

I don't hear anyone saying, "Let's make those nasty polluting farmers pay." I don't think we should say that. But I still think if we're serious about phosphorus, we have to deal effectively with farm runoff. And I think as a practical matter we have to deal with it in the same way we've dealt with municipal wastewater — through a massive publicly funded initiative.

It's fine to offer farmers financial aid for installing best management practices like contour cropping, streamside buffer zones and grass waterways. But even if we pay for those things fully, the farmers still have to maintain them. And such programs for the most part are voluntary.

If we want to clean up phosphorus, we have to do it systematically. And doing it by edict — you shall do A, B and C, Mr. and Mrs. Farmer — will never be popular, nor should it be. So the answer is to fund runoff controls with public dollars, in much the same way the Clean Water Act and state revolving loan funds for years have paid to build and upgrade wastewater treatment plants all across this country.

#### **ECONOMIC BENEFITS**

How would it work? Each year for, say, the next 10 or 20, a substantial amount of federal and state money would be allocated for rural runoff prevention. An army of newly minted ag-college graduates would go out into the field, work with farmers to design management practices appropriate to their operations and hire contractors (or pay the farmers) to install them.

This work would be done by watershed, based on priority — the most sensitive, valuable or impaired watersheds first. Once the management practices were installed, they would be inspected and maintained, again with state and federal dollars. Of course, all this would create well-paying jobs in the bargain.

Oh, but where will we find the money? Well, first of all, do we value water or not? If keeping our lakes and streams free of phosphorus pollution and noxious algae blooms isn't a public health and quality of life priority, I don't know what is. We should be willing to invest in it.

And second, aren't we better off spending money this way than by requiring clean-water plants to spend tens or hundreds of millions of dollars on

If we're serious about phosphorus, we have to deal effectively with farm runoff. And I think as a practical matter we have to deal with it in the same way we've dealt with municipal wastewater through a massive publicly funded initiative.

phosphorus control systems that quickly bump up against the law of diminishing returns — too little bang for too many bucks?

To cite one example, NEW Water, the clean-water agency serving the Wisconsin city of Green Bay, estimates it would need to invest \$200 million to meet its new permit limit for phosphorus. That would buy an awful lot of upstream runoff control measures that would do a great deal more to reduce phosphorus.

#### **EVERYONE'S JOB**

Yes, clean-water plants and industries should do their reasonable share to control phosphorus. Readers of this magazine, and their consultants, have been enormously creative in finding low-cost phosphorus reduction methods. That should continue, and responsible tightening of effluent phosphorus limits is probably appropriate.

But phosphorus from upstream is the bigger problem, and we need to tackle it head-on.

No one is crazy about the thought of another big government program, which rural runoff management would entail. But let's ask ourselves: What is the alternative? If anyone can suggest an effective way to curtail nutrient runoff, short of a sweeping, government-funded campaign, I am all ears.

Please share your opinions on this topic. Send me a note to editor@ tpomag.com. I promise to respond, and we will publish your comments in a future issue. **tpo** 

#### IDEA OF THE MONTH:

# I Hereby Proclaim

By Ted J. Rulseh

t's fairly common for governors to proclaim a special day or week to honor water and wastewater operators. Usually it's a state or regional operator association that takes the initiative and asks for such proclamations.

But if your governor does issue such a proclamation, how do you take advantage locally? Consider taking a cue from

the city of O'Fallon, Ill. After Gov. Pat Quinn proclaimed March

17-23 as Water and Wastewater Operator's Week in the state, Mayor Gary L. Graham and the city council issued a proclamation of their own to "further acknowledge the important role of water and wastewater operators in our daily life."



The O'Fallon message stated, "There are nearly 6,200 of these water and wastewater individuals in the state of Illinois, as well as a vast support network of professionals who

tirelessly work daily to keep the state's potable water and waterways safe. This industry, which has roots in the 19th century and is constantly evolving to meet environmental challenges and regulatory requirements, is vital to the citizens of O'Fallon."

A proclamation from a local official is probably more likely to get picked up in your local media than a proclamation from the governor.

It's not as difficult as you might imagine to get your governor's office to issue a proclamation on the profession's behalf. Go to the governor's home page on the Internet and you may find a link to instructions on the steps to follow. At the bare minimum you will find a "contact" button that will bring up a form where you can make your request.

Getting recognized with a proclamation is one small way to help elevate operators and the profession to the status of the fire chief and the fire department. **tpo** 



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## A better name

To the editor:

After spending over 37 years in the water and wastewater industry, I would agree that if we call it sewage or wastewater, most people still have a negative image of our profession. Almost all professions have had a name change over the years, and it is probably time for the wastewater operators to go through a name change once again.

The name of water resource recovery facility and water resource recovery operator are names that I believe would bring a positive image to our behind-the-scenes profession.

Brent E. Frazier, Retired Utilities Superintendent Pelican Rapids, Minn.

## **Preference for 'specialist'**

I myself, as I am known as an operator, would like to see the name changed from wastewater plant to water resource recovery plant. To me, this name says it all. Also I prefer the name specialist over operator. For all we do, specialist is more fitting, and I believe this title is more attractive for a younger generation coming into the water and wastewater industry. That's just my opinion.

Doug Allen Water/Wastewater Manager Village of Viola, Wis.

## Get over it?

I say just get over words. Sewage, wastewater — no big deal. But if a change must happen, I say: water recycling plant.

Vince Summers Lovingston, Va.

## **Shorter and simpler**

I am with you — I prefer "clean-water plant" for its simplicity. In my opinion, your point about "water resource recovery facility" needing further explanation is the main reason I dislike that version (although, having a bureaucratic tone is a close second).

Simple and to the point is better on a facility sign by the side of a highway anyway. Consider the following:

- Wastewater treatment plant 26 characters
- Water pollution control facility 32 characters
- Water reclamation plant 23 characters
- Clean water plant 17 characters
- Water resource recovery facility 32 characters

If simplicity (shortness) were the only criteria, "sewer plant" only contains 11 characters. But that does nothing to evoke images of fishing, swimming, canoeing, pleasant beaches or sunsets on the water. Of course, who knows where texting acronyms will leads us. Maybe we should be discussing the merits of CWP and WR2F.

Vick Pedregon Plant Superintendent Fred Hervey Water Reclamation Plant El Paso, Texas

## Don't muddy the waters

I dislike the terms put forth in the April *TPO* as names for wastewater treatment plants (specifically "clean water plants" and "water resource recovery facilities"). They literally muddy the waters.

High-minded people in positions of influence seem to have decided that terms with negative connotations are to be avoided; this must have arisen from studying politics and advertising. Supposedly, terms such as "pollution" and "waste" cause negative thoughts and unpleasant images. While I appreciate this concept, we are not selling a product and we are not promoting a candidate. We are a public utility (is that now a negative term to be avoided?). The term "water pollution control plant" used by some facilities brings a positive image to my mind, as pollution control is good.

The analogy to dairy farms misses the mark. A dairy farm's primary purpose is to raise animals to produce dairy products, not to produce manure; manure is a byproduct — it's used as fertilizer. At best, you might make the argument that it's a dairy farm and fertilizer producer.

Wastewater plants were created to take in and treat wastewater (and other waste streams that might otherwise end up in surface water or groundwater), remove nutrients and pathogens, and prevent pollution to the receiving waters. I recall a test question for my operator's license asking, "Why Treat Wastewater?" The answer was "to protect the environment and to protect public health." We have the ability for some excellent resource recovery with what we take in, but I think it's ridiculous to shy away from why we exist in the first place.

Where does the name-changing end? Will septic tanks become "water resource recovery tanks" and septage haulers "water resource recovery haulers"? Will I now work for the "Water and Clean Water Department"? Does the sewer collection system become "water resource recovery mains"? Rumor has it that even the term "facility" or "plant" is not positive enough — it connotes concrete and piping. The wastewater plant is now some type of "recovery center." Good karma abounds.

Boy, is everyone in for a surprise when they tour the plant and visit influent screening and septage receiving! When I tell people I work at the wastewater plant, about half the people immediately mention the name of (or something related to) the local water treatment plants, requiring me to explain that I work on the used water side. I'd prefer "sewer treatment plant" to what's being proposed — it leaves little room for confusion there.

As a final thought, on the Letters page in the April issue, a writer bemoaned being thought of as Ed Nortons. I admire the character of Ed Norton, and I'd be proud to be thought of as an Ed Norton. He was an honest, hardworking man with a great sense of humor.

Consider the Idea of the Month, "Can't Argue With Success?" right next to your editorial. Potty humor, and its success. I say, embrace what we are, what we do and what we treat. That's why I admire the show "Dirty Jobs," its host Mike Rowe, and the people and professions showcased. These people aren't shying away from what they do. The show educates the public as to what they do, and hopefully brings respect to what they do — without requiring an alias. I suggest we work more on education and information and less on renaming and branding.

CJ Kilgore Wastewater Treatment Plant Operator Ithaca, N.Y.

## Why not 'recycling'?

During all the years I worked as a treatment plant operator, I constantly got "the look" when I told people what I did for a living, but I knew I performed a valuable service for the environment. The current trend is to reuse as much as possible to save the environment, so why can't plants be referred to as water recycling centers?

Roger Campbell Utilities Superintendent, Retired Glendale, Ohio

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## **Excellent** name

I just read your comment in the April *TPO*. Very interesting. I think you hit the nail on the head — clean water plant is an excellent name. It is succinct and clear. It is what we do (or hope to do). Yes, let's call these places for what they strive for and not away from.

Derek Albertson, MPA Operations Manager Town of Branford (Conn.) WPCF

## Truth in advertising?

I find that if you call a wastewater plant by some other name, like water reclamation or anything with water in front of it, the general public thinks of clean water. I have seen where new plants have been constructed and people see "water" in the name and assume it is clean water. They build homes next door and then complain about the odor and noise.

Unless the general public is educated on the different names for treating wastewater, the name should clearly relate to what it really is. A pig farm should not be called "bacon in the making." So a "sewer plant" should have a name that clearly states what is really going on.

Lyndon Johnson Superintendent Village of West Jefferson, Ohio



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A full-catering kitchen, modern design and gorgeous gardens might be enough to steer Seattle brides toward the Brightwater Environmental Education & Community Center. The county

began marketing the facility as a wedding venue on Facebook, and the story went viral. See why Editor Ted Rulseh thinks it's a good publicity move for wastewater treatment plants. www.tpomag.com/featured



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# More Than Clean Water

THE ROSE HILL RESOURCE MANAGEMENT FACILITY LIVES UP TO ITS NAME BY ADDING HOUSEHOLD RECYCLING, TREE FARMING AND MORE TO PRODUCTION OF CLEAN WATER AND BIOSOLIDS

By Steve Frank, APR, WEF Fellow

THE ROSE HILL (KAN.) RESOURCE MANAGEMENT Facility does much more than reclaim the city's wastewater and return it to the environment. It incorporates a single-stream recycling center, a tree farm and a green-waste composting facility.

Add that to cleaning the water and producing Class A, EQ biosolids and you've got a facility that practices recycling in its broadest sense.

Despite the bright recycling picture, its operators face a problem many clean-water operators struggling to run plants that are past due for modernization and expansion would love to have: an underloaded plant. Its design capacity is four times the average hydraulic load.

Jamie Belden, Dillan Curtis and Adam Pompa face that challenge with enthusiasm. Their plant can treat 1.1 mgd, but actually processes only 250,000 gpd. In the words of Curtis, lead water and wastewater operator, "It's not an easy O&M problem."

Jamie Belden, Public Works superintendent, says the operations staff members scratched their heads and worked together to come up with solutions. Belden had run an underloaded plant in Wichita, but, "When you're operat-



ing like this, a lot of your textbook stuff flies out the window.

"We've learned to rely on our oxygen levels between basins and to operate with the philosophy that if we hit the right oxygen levels in the anaerobic and anoxic zones and the oxidation ditch, and operate with higher activated sludge return rates, we'll be successful."

Apparently so: The plant, completed in 2009, won the 2012 Kansas Water Environment Association (KWEA) Plant of the Year Award in Class 3 (plants serving 3,500 to 10,000 population).

"I talk about water and that there's no new water being made, so we have to recycle what we have. Then we talk about how we do our part in cleaning the water here, and we talk about where it goes." JAMIE BELDEN



Superintendent Jamie Belden tends the tree farm at the Rose Hill Resource Management Facility. The trees will be transplanted around the city. (Photography by Ed Zurga)

INTERNAL LOOPS The Rose Hill facility serves a

population of 4,000 in a bedroom suburb about 11 miles from Wichita. It sits mostly alone about a mile outside town. A subdivision has grown up to the north, but other neighborhoods have not encroached.

Four lift stations in town and a fifth at an industrial park feed the plant via a force main. Flow comes into the headworks where a spiral screen (WesTech Engineering) removes trash and debris. After passing through grit removal (Kusters Water A Div. of Kusters Zima Corp.), the water goes to an anaerobic zone for denitrification, then to an anoxic zone and the oxidation ditch.

Some overflows to the clarifier to settle the settleable solids. Clear water



then goes over the weir to a UV disinfection system (Evoqua Water Technologies) and cascades to re-aerate as it enters Eightmile Creek. Return flow from the clarifier goes back to the anaerobic zone. "The internal loops are the only way to make it work," says Belden. "We do that to remove nitrogen and the phosphorous."

Belden said the staff has increased the return activated sludge rate to achieve detention times closer to the design times. The basins are sized for detention times associated with a flow of 1.1 million gallons per day, yet detention times are longer because the actual flow is only 250,000 gallons per day.

Sludge wasted from the process goes to two anaerobic digesters. A belt filter press (Aero-Mod) dewaters the digested material to 18 to 20 percent solids. Biosolids are dried in windrows outside. Hot, dry summers like those of the past two years have yielded an *E. coli* count of zero and an 87 percent

BUILT:	2008-2009	
POPULATION SERVED:	4,000	
FLOWS:	250,000 gpd	
TREATMENT LEVEL:	Advanced secondary	
TREATMENT PROCESS:	Oxidation ditch	
RECEIVING STREAM:	Eightmile Creek	
BIOSOLIDS:	Class A Exceptional Quality, and gardens	applied to parks
ANNUAL BUDGET:	\$1.2 million	
WEBSITE:	http://cityofrosehill.com	
GPS COORDINATES:	Latitude: 37°35′18.04″ N; Longitude: 97°07′20.11″ W	

The staff at the Rose Hill Resource Management Facility includes, from top, Adam Pompa, operator; Dillan Curtis, lead operator; Kathy Vines, administrative assistant; Jamie Belden, superintendent; and Kirk Hayden, Public Works director.

## **HOMEGROWN TALENT**

The operating team at the Rose Hill Resource Management Facility came straight from Kansas and in two cases from Rose Hill itself.

Dillan Curtis, lead water and wastewater operator, came aboard in mid-2008 and was on hand for the last year and a half of the new plant's construction. He graduated from Rose Hill High School and worked summers with the city Public Works Department while attending Friends University in Wichita before joining the plant team. He is certified as a Class II wastewater operator.

Adam Pompa, operator I, also a Rose Hill High graduate, joined the team in 2009 before construction was completed. A certified Class II wastewater operator, he does much of the maintenance work.

Jamie Belden, Public Works superintendent, has been with the Rose Hill plant since 2009. He earned a bachelor's degree in biology at Friends University and followed up with an internship doing bioassessments with a biologist on the Arkansas River for the city of Wichita. He was accepted at Pittsburgh State University for masters work in stream fisheries ecology but saw a shortage of jobs and low pay in that field.

Friends in Wichita told him of an opening in the Sewage Treatment Division's pretreatment area. He worked there for almost a decade and then as an environmental health and safety manager in private industry before coming to Rose Hill. "It's only three miles from my house," he says. He holds a bachelor's degree in biology with an emphasis in environmental studies and is certified as a Class IV wastewater operator.



Dillan Curtis checks the dissolved oxygen level in the bio plant's basin.

solids Class A Exceptional Quality biosolids product, used at the plant to help grow trees and elsewhere in the city in gardens. Belden is working to develop a long-term, free-distribution plan for the community.

#### CONSISTENT COMPLIANCE

The plant began operating in 2009. Before then, the city had a smaller lagoon system but had trouble meeting discharge limits even after expansion. "We were 'strongly encouraged' by the Kansas Department of Health and

PERMIT AND PERFORMANCE			
	INFLUENT	EFFLUENT	PERMIT
BOD	150-200 mg/L	Compliant	Monthly avg.: * Oct-Mar: 30 mg/L * Apr, May, Sep: 25 mg/L * Jun-Aug: 20 mg/L
TSS	150 mg/l	0-10 mg/L	30 mg/L
Ammonia	N/A	Compliant	8.9 mg/L daily max. 2.2 to 6.4 mg/L monthly avg
Total nitrogen*	N/A	5 mg/L	8 mg/L
Phosphorus*	N/A	1 mg/L	1.5 mg/L

\* Guidelines only

Environment to build the present facility," Belden says. The lagoons remain available for extraneous flows, meaning extreme wet-weather events, or times when equipment failures take the processes offline. The flow could be returned for reprocessing if necessary, but most of the time the water is simply allowed to evaporate.

The plant was designed for easy expansion with population growth. "It's stubbed out so we can add mirror-image processes," Belden says. Professional Engineering Consultants designed the plant, and Walters Morgan Construction built it. The plant's discharge limits "are pretty strict, but we've never even come close to exceeding any of them," says Belden.

The ammonia limit swings from a high of 6.4 mg/L in winter to a low average of 2.2 mg/L from June to August. As of now, there are guidelines but no firm limits for nitrogen and phosphorus. "We monitor them," Belden says. "The Department of Health and Environment wants to see 8 mg/L for nitrogen and 1.5 mg/L for phosphorus. We typically achieve our annual averages pretty easily." Nitrogen averages less than 5 mg/L and phosphorous 1 mg/L.

#### SUSTAINABLE PERFORMANCE

Belden believes the KWEA Plant of the Year award recognized the plant's good operations and maintenance, its energy-efficient design, and how it lives up to the "resource management" part of its name. One energy-saving feature Belden appreciates is radiant heating in the floor of the precast concrete administration building. "We recently had one of our coldest winters in a long time," he says. "Because the heat is in the floor, we rarely had our furnace kick on."

The "furnace" is actually a small electric boiler it uses much less energy than a furnace. Hot water circulates through the floor, heating it and allowing the heat to rise. This arrangement helps maintain a comfortable temperature in the work areas without heating the overhead space.

The administration building lighting is all compact fluorescent, and the facility is moving toward LED lighting at lift stations. Occupancy sensors keep spaces from being lit unnecessarily.

All pumps at the plant have variable-frequency drives with soft starts. "That saves energy and helps make the equipment last longer," Belden says. "The engineers designed the plant to be as energy efficient as possible. In the long run, they saved the city and taxpayers money."

#### **RECYCLING PLUS**

Kirk Hayden, Public Works director, pushed for the entire resource management idea, including radiant heating and the electrical energy-saving features, during plant design. "I wish I'd thought of these ideas, but I inherited them," Belden said.

The plant is also attractive in appearance: "People usually don't want to live next door to a wastewater treatment plant, but we've addressed that." The tree farm, recycling and green-waste processing use normally empty space next to the treatment plant. "This encourages citizens to become acquainted with the facility and ask questions, thus minimizing the wastewater stigma," says Belden. "And odors are minimal unless there's a process issue."

(continued)



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Kathy Vines tosses office recyclables into the plants' single stream recycling bin. Rose Hill and Butler County residents have access to the bin to drop off all their recycling items.

Single-stream recycling is a joint city-county venture. Residents bring in recyclables but don't have to separate them. A recycling contractor separates and removes them.

The plant takes green waste such as tree branches, limbs, trunks, and stumps and chips them to make mulch. The city's Streets and Parks Division, which Belden also manages, runs that process. Mulch is used at the plant's tree farm and is provided free to citizens. The plant also takes in grass clippings and makes compost for citizens' use.



Adam Pompa, right, and Dillan Curtis sample mixed liquor suspended solids (MLSS) from an aeration tank.

"We recently had one of our coldest winters in a long time. Because the heat is in the floor, we rarely had our furnace kick on."

#### JAMIE BELDEN

At the tree farm, Belden's goal is to grow enough trees to satisfy the city parks' needs, and to offer any surplus trees at a discount to residents. He gets excited when describing how the resource management facility is helping to educate the public.

"Most people think the tree farm is pretty neat," he says. "They drive by and see that we're growing trees, and it stimulates questions. When we explain it, they say, 'That's a great idea.""

Emphasizing the recycling also helps when school kids, Boy Scouts, Girl Scouts and others come for plant tours.

Belden starts tours with a simple question, like "What can we recycle?" The usual answers quickly go toward the single-stream center and green waste, which the visitors can easily see. Belden then leads them to think

about recycling water: "I talk about water and that there's no new water being made, so we have to recycle what we have. Then we talk about how we do our part in cleaning the water here, and we talk about where it goes."

He finds that the adult chaperones often get more interested than the kids. "I'm trying to promote community involvement," he says. "It's a huge part of getting the word out and helping our industry. It also helps get more people like those with biology, chemistry and engineering degrees interested in running these modern, complex plants."

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# Same Treatment Quality, Less Energy

A MISSISSIPPI PLANT COPES WITH HIGH FLOWS FROM TWO POULTRY PLANTS WITH A NEW SCADA SYSTEM AND AUTOMATED CONTROL OVER DISSOLVED OXYGEN

By Doug Day

hen most flow comes from just two industrial sources, a wastewater treatment plant has to be ready to respond to changes in operations. That is easier in Morton, Miss., since a plant update in summer of 2012.

Two poultry processing plants account for about 85 percent of the average 2.5 mgd flow at the Morton Wastewater Treatment Plant. When the plants operate at peak output, however, their flows often push the treatment plant up to or beyond its 3.15 mgd design capacity. "If not for the poultry processing plants, we would have hardly any flow at all," says Rickey Parker, plant manager. "They run from Sunday night to Friday night." When they shut down for the weekend, flows quickly drop to 0.5 mgd.

New automation technology, including a new SCADA system, dissolved oxygen probes and DO controls, has made life easier on Morton's four operators. "Somebody used to have to come in Friday or Saturday morning after the processing plants shut down and reset the blowers," Parker says. "And then we'd have to come back several hours before they started up Sunday night and reset the blowers again.

"Changing flows from a half-million mgd to more than 3 million, treatment would slow down dramatically for the first couple days of the week. The system gets behind, and it takes a while for it to catch up. It was kind of a guessing game. We always had to have the blowers running more than was necessary."



The two SBRs at the Morton Wastewater Treatment Plant handle high-strength waste from the city's two poultry processing plants. A new SCADA system and dissolved oxygen control make the plant more energy efficient.



Automatic blower control based on data from new dissolved oxygen probes means operators no longer have to manually reset the blowers when flows drop as industrial customers shut down for the weekend (Hach).

#### TIME FOR RENEWAL

While treatment in its two sequencing batch reactors (SBRs) was effective, the 1991-era plant needed to improve its energy efficiency and replace aging equipment. The staff called longtime engineering consultants WGK of



Clinton, Miss., to develop an improvement plan. The changes that went online in the summer of 2012 also provided an opportunity for expansion to make room for additional growth in the community of 3,500, about 200 miles north of New Orleans.

Over the years, the plant's analog programmable logic controller (PLC) had become outdated. The manufacturer eventually told Parker that parts would no longer be available because the system was so old. "If something happened, we'd have to run the plant manually until we could change over to a new PLC," says Parker. "Other pieces of equipment were also wearing out."

Aqua-Aerobic Systems provided a new SCADA system, since the company had provided the original SBR equipment. All three 150 hp blower motors were also replaced with U.S. Motors high-efficiency models of the same size (Nidec Motor Corporation).

The key to the plan was adding Hach LDO DO sensors and sc200 analyzers; the plant had no DO monitoring equipment previously. "We had to set the blowers at a level we knew would maintain a DO level no matter what the loading was," says Parker. "We were wasting a lot of power. That's where we get most of our energy savings — by controlling the amount of air we put into the aeration tanks."

- Other improvements included:
- Replacing a worn-out mechanical screen with an Aqua Guard bar screen (Parkson Corporation)
- Adding a Philadelphia Mixing Solutions model 3801-S headworks mixer (motor, shaft and support bearings)
- Adding a Wallace & Tiernan Series 32-050 lime feed system (Evoqua Water Technologies)
- Replacing all 1,000 diffuser sleeves

"We had to set the blowers at a level we knew would maintain a DO level no matter what the loading was. We were wasting a lot of power. That's where we get most of our energy savings — by controlling the amount of air we put into the aeration tanks."

#### **RICKEY PARKER**

#### SAVINGS MATERIALIZE

After the first year of operation, Parker found the plant's annual electricity use had dropped by 12.5 percent (21,500 kWh). That equates to about \$1,100 a month off the plant's electric bill, compared to a monthly debt payment of \$2,000 for the improvements The total projects cost of \$400,000 was

reduced by a 20 percent loan forgiveness for green infrastructure programs through the state Department of Health.

"I'm real pleased with the upgrade," says Parker. So was the Mississippi Municipal League: The project earned an excellence award from the group for the city and WGK.

Parker credits the processing plants for running pretreatment programs that make sure their flows don't challenge the plant's treatment capabilities. "Our BOD coming in is about 200 mg/L" he says.

## **READY FOR THE FUTURE**

With a new SCADA system providing better control of his wastewater treatment system, plant manager Rickey Parker is better prepared for future challenges and opportunities. The SCADA system was designed to easily support a third sequencing batch reactor.

Parker isn't sure when it will be time to expand, but he hopes to get the work done in the next five years. "It's all set up for a third tank," says Parker. "During the week, we normally run right at or above the permit level of 3.15 mgd. We really don't have the capacity for new industry to move in."

Parker hopes the modernization and updated SCADA will also make it easier for the plant to meet future regulatory changes, especially dealing with nitrogen and phosphorous. "The only thing I'm worried about is lower limits on nutrient levels when we get our new permit this year," he says. "We've had no problems meeting them. But if the levels got low enough, I guess we might end up doing some other type of treatment. So far, we're able to handle everything, and the plant is running fine." "Solids are less than 100 mg/L, ammonia is 25 to 30, TKN is about 35, and oil and grease is less than 5 mg/L."

Despite the high volume, the plant never had a problem providing proper treatment to meet its effluent permit levels, even before the improvements. "BOD removal is normally around 98 percent," says

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Parker. "TSS is somewhere around 88 to 96 percent, and pretty much 99 percent on ammonia. The plant has run well ever since we put it in. The improvements make it a lot more efficient." **tpo** 

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# TROUBLESHOOTER

GARY HANSON DOUBLES AS AN OPERATIONS SPECIALIST FOR A GLOBAL CONSULTING FIRM AND SUPERINTENDENT OF A TINY UTILITY. BOTH PROFIT FROM HIS PROBLEM-SOLVING SKILLS.

FOR GARY HANSON, WASTEWATER IS MORE THAN FLOWS, LIFT STATIONS and chemicals. Over the last 38 years, it has been his life's work — a career that has taken him all over Wisconsin, the United States and the world.

A Wisconsin-licensed wastewater (Grades 1-4) and water treatment (Grade 1) professional and certified environmental trainer, Hanson juggles two jobs with aplomb. He's a senior operations specialist with the AECOM global consulting engineering firm and, for the past 36 years, part-time superintendent of the Yorkville (Wis.) Sewer Utility.

His dedication and problem-solving skills earned Hanson the 2012 Koby Crabtree Award from the Wisconsin Wastewater Operators Association (WWOA) for excellence in the transfer of technical information and training in the wastewater field. Hanson knew the award's namesake, the late Dr. Koby Crabtree, a Hiroshima survivor and wastewater microbiology specialist who shared his knowledge with plant operators nationwide.

"I never expected to win this award; it came as a complete surprise," says Hanson, 63. He has been active in the WWOA since 1975, serving as treasurer, recorder and president of the Southeast District and as director, vice president and president of the state group. With the Water Environment Federation, he serves on the plant operations and maintenance committees and has organized sevBy Jack Powell



Gary Hanson of the Town of Yorkville Wastewater and Water Treatment Plant was the 2012 recipient of the prestigious Koby Crabtree Award. (Photography by Mark Hertzberg)

THE RIGHT MOVES

With a bachelor's degree in Business Administration from Carthage College in his hometown of Kenosha, Wis., Hanson in 1975 joined the Village of Union Grove as water and sewer superintendent. He worked there until he joined an AECOM predecessor company in 1988, citing the need "to learn new things and advance in my career." In 1981 he began his 33-year association with the Town of Yorkville Sewer Utility.

Hanson calls his AECOM position, "the best job in the company, because I get to see the wastewater plant before we do upgrades and modifications. Then I get to be part of those activities and go back at completion and help start the plant up, train the operators and make sure it works."

Although his primary focus has been the Midwest — Wisconsin, Minnesota, Michigan, Iowa and Illinois — he has worked recently in Texas, California, Florida, the Chesapeake Bay region and around Washington, D.C. He traveled to Egypt in 1999 to oversee the building of wastewater plants and the training of operators.

Over the years, Hanson has overseen activities at treatment facilities from the smallest — 25,000 to 50,000 gpd flow — to the 125 mgd plant in Arlington, Va., and the 150 mgd operation in Orange County, Calif. In addition, he has worked on plants in Racine and Waukesha, Wis., and has trained

eral hands-on workshops at the annual conference. He's also a member of the American Water Works Association and the National Environmental Training Association.

Hanson was appointed by former Governor Jim Doyle to revise Wisconsin's wastewater operator licensure criteria and now serves on the Department of Natural Resources committee to update the wastewater operator certification exam. "I've been very involved with the WWOA, which has given me a lot of opportunities to grow professionally and I've tried to give back to it," he says.

#### **PROJECTS VARIED**

gestions to bring the facility into compliance.

"I'm pleased that I can help utilities and wastewater operators solve problems," says Hanson, who drives more than an hour to the AECOM offices in Sheboygan every day. "That's what keeps my job interesting and rewarding — the ability to get involved and contribute ideas for doing things better."

thousands of operators. He often gets calls out of the blue that a plant has a

problem, and in those cases he works with the operating team, offering sug-

Hanson listens to make sure pumps are operating correctly and checks the hour meters in the main lift station at the plant.

"I'm pleased that I can help utilities and was operators solve problems. That's what keeps interesting and rewarding — the ability to get and contribute ideas for doing things better." GARY HANSON

## **ELEVATING KNOWLEDGE**

How do you transfer technical information about wastewater treatment? Gary Hanson is a good person to ask, since he won the Wisconsin Wastewater Operators Association Koby Crabtree Award, partly for his ability to do just that.

Hanson says the focus has changed since he started nearly 40 years ago. Back then, wastewater professionals were interested mostly in BOD and TSS removal. Today, while those parameters remain important, operators look more closely at removing phosphorous, nitrogen and E. coli.

As for the information transfer process, Hanson says, "I write documents to help people operate the plant the way the engineers designed it. Basically you give them reference books and do formal classroom training.

"Then you observe the operators as they go through their activities, so when they look at ORP numbers, they know what they mean. We never used ORPs in the 1970s, 1980s and 1990s. Now they've become prevalent, but you have to understand what they're telling you. Do you have an anoxic zone or anaerobic conditions? We never even talked about those issues when I started."

Hanson sees two groups who use such information. One consists of young people, especially those from the University of Wisconsin-Stevens Point, which has an outstanding natural resources program: "They are energetic and enthusiastic about clean water and the environment and eager to put their knowledge to use."

Another group consists of those 35 to 40 years old, displaced from jobs by the economy and entering the wastewater industry as a second career. "That's the group I interact with the most," says Hanson. "They have certain skills but don't know laboratory or sampling procedures and other things you need to run a treatment plant.

"They are eager to learn, but primarily about what their facilities have and how to maintain it. Young college grads want to push plant operations to the next level: energy recovery and operating efficiencies to make their plants world-class. Getting both groups the information they need is an exciting part of the work I do."

# orofile

## Gary Hanson, AECOM/ Town of Yorkville (Wis.) Sewer Utility

POSITIONS: Senior operations specialist (AECOM) and part-time superintendent (Town of Yorkville Sewer Utility)

EXPERIENCE: 38 years in water/wastewater industry

DUTIES: AECOM: oversee treatment plant designs, assist startups, train operators; Yorkville utility: supervise 4 part-time operators

EDUCATION: Bachelor's degree, business administration, Carthage College, Kenosha, Wis.

CERTIFICATIONS: Wisconsin Grades 1-4 wastewater operator, Grade 1 water operator

GOALS: Continue helping clients and community meet wastewater needs Gary Hanson, right, speaks with lab technician Jack Kerkman, reporting for his shift. Hanson has built a reputation as a capable and caring team leader.

That said, he pointed to several projects that have brought him great satisfaction.

He worked on a capacity expansion (from 1 mgd to 3 mgd) at the Northwest Regional Wastewater Treatment Facility, a total nutrient removal plant in Polk County, Fla., that produces reclaimed water for irrigation.

The project called for rehabilitation of equipment including grit removal and oxidation ditches, conversion of two clarifiers, modifications to pumps and filters, building of a high-service pump station for reclaimed water and installation of piping. Hanson reviewed the design, oversaw construction, and trained operators in handling the new equipment and treatment process. Work was completed in June 2013.

Hanson also led the startup and training for a new activated sludge wastewater treatment facility in Watertown, S.D. The former plant consisted of 350 acres of failed seepage lagoons; it needed a superintendent and a trained staff, and Hanson acted as temporary superintendent.

"We hired a superintendent and I assisted with that," Hanson says. "We trained the staff and constructed a new plant and improved operations. It went from being one of the worst operating plants in the nation, according to the EPA, to winning the EPA Region 8 Award for being one of the best operated plants. The staff worked hard, the superintendent was talented, and I'm happy to have been part of its success."

A recently completed staffing study for the 150 mgd Arlington plant "has been a lot of fun," Hanson says. The plant has about 80 employees, but management wanted to know if that was enough, if they needed to add more, or if they needed to reduce staffing. Hanson spent a week interviewing and evaluating team members — walking around, talking with operators and listening to what they had to say. He made recommendations based on his decades of experience in more than 200 plants.

"Arlington wasn't able to find qualified people, so we had to come up with creative ideas," Hanson says. "One thing I recommended was that instead of running ads in the local newspaper they go out and market themselves as a great place to work. I also suggested plant representatives go to Baltimore, which has a big Navy presence, and recruit from those leaving the service. They have begun to implement that program."

#### **CLIENT FOCUS**

Phil Mentink, a design engineer for AECOM's wastewater treatment business, attributes Hanson's success to his laser-like focus on client service. The

"Gary is conscientious, personable and gets along well with everybody. He's fun to work with, and he just won't quit. He'll keep working until he gives you what you need to solve your problem, and our clients love that." PHIL MENTINK

two have worked closely together for nearly 25 years on developing treatment plants, from initial design to setting up equipment and other operations and maintenance services.

"Client service is very important," says Mentink. "Gary is great in that regard. He's conscientious, personable and gets along well with everybody. He's fun to work with, and he just won't quit. He'll keep working until he gives you what you need to solve your problem, and our clients love that. With his knowledge of how wastewater plants should work, he gives them excellent support."

Hanson applies that same service commitment to his other job as parttime superintendent for the town of Yorkville, heading over to the 150,000 gpd treatment plant at 5 a.m. on weekdays and weekends. He remembers vividly the day in 1981 when he took on the responsibility of running the facility.



#### **STAFFING UP**

"The town board told me they were building a wastewater treatment plant and starting a sewer utility," says Hanson. "They asked if I would give them some advice and look over their shoulders, which I agreed to do. When the system was close to coming online, they asked me how I would staff the utility.

"I suggested they hire skilled part-time employees and pay them well so they would stay. My reason for part-timers was that the utility and treatment plant were really small and had a very simple permit. The board then asked me if I would manage the utility and hire several people to help me. I accepted and have been there ever since."

> For the activated sludge plant, Hanson and his team do nitrification, BOD and suspended solids removal. His team includes Jack Kerkman, who does the lab work; Nick Carriker, who handles maintenance; Joe Vander Molen, who focuses on grounds care, keeping the property well-trimmed so that it looks like a park; and Paul Richter, who "floats"

to wherever he is needed — that includes maintaining the utility's three lift stations. The plant serves about 3,000 customers, and the effluent meets all U.S. EPA and Wisconsin standards.

#### AGGRESSIVE MAINTENANCE

One reason for this strong performance is Hanson's aggressiveness with maintenance. Each year he devotes a sizeable portion of his \$350,000 annual budget to televising, cleaning and repairing sewer system leaks as they appear.

He hires a firm to pull TV cameras through the sewers to find leaks, then has them repaired right away. The team tries to keep everything functioning well, and that includes reducing I&I. Because everyone has a second job, no one is at the plant from about 6 a.m. until Hanson stops by on his way home around 6 p.m.



Hanson takes manual measurements at the plant, comparing the readings to those taken by an automatic probe.

"Gary is a super guy, who's cooperative, helpful and meticulous in his work," says Peter Hansen, Town of Yorkville Sewer Utility chairman. "He's got four part-time people whom he manages very well. Everything at the plant is always in good shape, including the landscaping. The plant looks like a park between county buildings, so it's hard to tell it's even there when you drive by. That's a real credit to Gary and his team."

Hanson downplays such praise, preferring to focus on wastewater as being a good career — despite the fact his wife says he has no life outside of work. "It pays reasonably well, and it has enabled me to provide for my wife and two daughters," Hanson says.

"When the alarm goes off at four o'clock in the morning, it's not like I

have to drag myself out of bed and face the grind. You never know what will happen during the day. That's what keeps everything interesting. Although I'm at retirement age, I still like what I do, and want to keep solving problems." **tpo** 

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## **PLANTSCAPES**







# **Best Face Forward**

JACK-O'-LANTERNS CARVED FROM PUMPKINS GROWN AT THE TREATMENT PLANT AND FERTILIZED WITH BIOSOLIDS HELP MAKE A POINT TO KIDS IN A SOUTH DAKOTA TOWN

#### By Jeff Smith

an jack-o'-lanterns become the face of clean water? It's a possibility in the town of Keystone, S.D. Pumpkins are becoming an important part of operations at the town's extended aeration advanced activated sludge treatment facility.

"We thought having a pumpkin carving and decorating contest with pumpkins grown at the plant would help showcase our facility and add some fun to our annual fall carnival held around Halloween," says Jerry Przybylski, public works director, whose duties include operating and maintaining the water and wastewater treatment plants. The aim is to engage kids and visitors in an activity that highlights the benefits of the treatment process.

#### **EXPANDING GARDEN**

Operators planted pumpkins in a 0.1-acre plot at the site of the new treatment plant (1.0 mgd design, 0.2 mgd average). Przybylski, with mechanics Walt Digmann and Jim DeHaai, plan to expand that to 2.5 acres as the carving contest grows more popular. The plot is fenced to keep deer out, and its soil is replenished with biosolids from a nearby lagoon that was decommissioned after construction of the activated sludge plant in 1999.

Plant staff picked the pumpkins and delivered them to the town's Halloween Carnival at the community center, where the carving, decorating and judging took place. "We had about 30 carvers and decorators this first year," Przybylski says. "The younger kids decorated pumpkins and the older kids did the carving."

Lance Enricht, Keystone fire chief, won the adult division with his carving of Smokey the Bear. Sixth-grader Jarod Cline won the teen division, and 5-year-old Kirra Jenson won the youth division with her carving of a witch on a broom. Each winner received a cash prize funded by the contestants' \$5 entry fees. Judging was by popular vote of carnival attendees, who dropped pennies into a cup in front of each contestant's pumpkin. "All the kids received some sort of prize," says Przybylski.

CLOCKWISE FROM LEFT: Mature pumpkins ready for harvest at the Keystone treatment facility; from left, staff mechanics Jim DeHaai and Walt Digmann and public works director Jerry Przybylski with blossoming pumpkin plants; a few of the carved pumpkins entered in a contest held for local kids.

#### PLENTY OF PROMOTION

To promote the contest, operators distributed posters to merchants in the town, which sits at the base of the Mt. Rushmore National Monument. An electronic billboard and a sign board at the town's main intersection announced the details. Newspaper stories also publicized the event. More than 150 residents attended the carnival. "It was a crazy success," Przybylski says.

The idea for the contest sprang from Przybylski's observation of white tail and mule deer eating old pumpkins he had thrown into a field near his home. "I am originally from Wisconsin, and we grew pumpkins," he says. "Back there, the deer never messed with our pumpkins, but here they eat them."

When he first suggested growing pumpkins to Digman and DeHaai, they laughed it off in a good-natured way. But eventually they liked the idea and made some suggestions. The idea of a contest for the community grew from there.

#### **BIG INFLUX**

The town of Keystone's population of 327 residents swells to as many as 8,000 between Memorial Day and Labor Day, as nearly 3 million visitors flock to Mt. Rushmore each year. "That wide fluctuation in flow of influent puts a stress on the plant operation," Przybylski says. But it's during the low-flow times when the maintenance crew attends to the pumpkin patch with seeding, weeding and harvesting.

"It will all be worth the effort," Przybylski says. "We're already making plans for next year. We expect to have a pumpkin festival each fall that will benefit the kids and help to promote the plant for a long time to come." tpo



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# Proud History, Exciting Future

Jody Slagle, compost and biosolids reuse manager, walks between the compost windrows at the Hornsby Bend Biosolids Management Plant: (Photography by Kelly West) MILLIONS IN FEDERAL STIMULUS-FUNDED PROJECTS HELP AUSTIN ENHANCE ITS RESPECTED BIOSOLIDS PROGRAM AND PREPARE FOR TRANSFORMATION TO BROADER RESOURCE RECOVERY

By Ted J. Rulseh

#### THE HORNSBY BEND BIOSOLIDS MANAGEMENT PLANT

has come a long way since its creation in the 1950s. Back then, its lagoons stored biosolids from the city of Austin's wastewater treatment plant. After treatment, all the separated water was discharged to the Colorado River under a discharge permit.

"That's just how things were done here back then," observes Ken Lockard, facility superintendent.

Today, Hornsby Bend is a zero-discharge facility that produces Class B biosolids for land application, uses the city's yard wastes to create Class A biosolids compost for wholesale and retail trade, and generates biogas to produce electricity for sale to the power grid and heat for plant processes. The city has a history of beneficially using all biosolids produced as either Class A or B, keeping it out of the landfill.

On the radar screen for the future is the possible addition of residential food waste and fats, oils and grease (FOG) to the plant's eight anaerobic digesters, producing still more biogas and potentially more renewable energy. All that is in line with the city's larger green energy and waste reduction master plans.

The facility's present operations and future outlook have been strengthened by federal stimulus-funded projects that improved the composting facilities, significantly enhanced digester performance and added a biogas-fueled cogeneration system. Jody Slagle, biosolids reuse manager, observes, "We are beginning to transform our thinking from just handling biosolids to taking a broader role as a site for resource recovery."

#### **REUSE PIONEER**

Austin, a heart-of-Texas city of 900,000 and the state capital, has been a national leader in beneficial use of biosolids. Land application of Class B material began in the early 1980s. Production of compost, brand-named Dillo Dirt (after the armadillo, the city's unofficial mascot), began on a pilot basis in 1987 and went commercial two years later.

Hornsby Bend receives a 70-30 mixture of primary and waste activated sludges — about 1.5 mgd in total — via pipeline from the city's two secondary wastewater treatment plants:

- Walnut Creek (75 mgd design, 52 mgd average, about 8 miles away)
- South Austin Regional (75 mgd design, 42 mgd average, about 3 miles away) Biosolids are screened, thickened and anaerobically digested, then dewatered



on belt presses for land application or to mix with ground wood and grass clippings for composting. Net annual biosolids production is about 20,000 dry tons.

The Hornsby Bend site is also home to the Austin Water Utility Center for Environmental Research, a joint project with the University of Texas and Texas A&M University devoted to ecology and sustainability studies. In addition, the site's 200 acres of ponds are a magnet for migrating waterfowl and a top area destination for birdwatchers.

## "We are beginning to transform our thinking from just handling biosolids to taking a broader role as a site for resource recovery." JODY SLAGLE

#### LONG EVOLUTION

The city acquired the Hornsby Bend property over several decades starting in the 1950s at a bend in the Colorado River. Today the facility totals about 1,200 acres, about 800 acres actively used. The rest of the land is left as a natural buffer from the river and is mostly open to the public. In the mid-1960s, a conventional activated sludge wastewater treatment plant with its own discharge permit was built on site to serve nearby Bergstrom Air Force Base and the surrounding community of Del Valle.

The modern version of Hornsby Bend began taking shape in the 1980s. Discharge from the biosolids lagoons to the river stopped, the digesters were built, and five 5-acre open-air concrete evaporation basins were added to dry



ABOVE: Biosolids are mixed with organic material, some of it from city yard waste collections, to form high-quality compost. LEFT: Superintendent Ken Lockard (components of the facility's methane gas treatment system are in the background).

biosolids for land application. Today, about two-thirds of the biosolids are land-applied, 70 percent of that offsite by a contractor and the rest on 454 acres at Hornsby Bend, where a contract farmer grows hay and pays the city a share of the sale proceeds (about \$60,000 last year).

The Dillo Dirt program, which takes care of the remaining one-third of biosolids, expanded greatly in the mid-1990s. The Air Force base closed, and the city relocated its airport to that site. That meant the city's landfill, which was next to the base, had to close by order of the Federal Aviation Administration because it attracted birds that could jeopardize aircraft.

Faced with paying tipping fees to a private landfill, the city needed to reduce waste volume and did so by diverting yard waste and tree trimmings — 15 percent of the waste stream — to Hornsby Bend for composting. The concrete composting pad was doubled in size to 14 acres and grinding equipment added.

Then, as now, the city used the windrow composting method. "It's a simple, fairly forgiving process," Slagle says. Team members use Wildcat (Vermeer) and Scarab windrow turners to mix the material.

After windrow processing, the material is cured, screened and sold wholesale for \$13 per cubic yard to about 50 garden centers, nurseries and landscapers, who in turn sell it to consumers. "Our approach has been to keep our end of this operation as simple as possible," says Lockard. "Rather than dealing with mom and pop customers and trying to bag the material, we keep the focus on producing a quality compost product." Dillo Dirt generates about

\$250,000 in annual revenue.

#### TO THE NEXT LEVEL

The past few years have seen dramatic steps forward at Hornsby. The city took advantage of the American Reinvestment and Recovery Act of 2008 (federal stimu-

lus) to get a \$31.8 million zero-interest loan for wide-ranging improvements.

A key component was a new 15-acre concrete compost pad. "We had already laid it out the way we wanted it, with slopes and retention basins to hold a 100-year flood event," says Slagle. "Our consultant had estimated a cost of \$12 million, but we were able to build it for a little over \$7 million." That's because the economy was down, materials were cheap and contractors were hungry for work.

All water that runs off the old and new pads is captured and treated on site. "We haven't discharged at Hornsby Bend for over 25 years," says Lockard. "We have an irrigation system installed back in the 1980s with four large central pivots that handle the water from our ponds. All our process water

## **TARGET ZERO**

The Hornsby Bend resource recovery initiatives are part of the City of Austin's Zero Waste By 2040 initiative.

In December 2011, the city council adopted the Austin **Resource Recovery Master** Plan, culminating two years of research and community input. The plan outlines aggressive milestones to ensure that the Zero Waste goals are achieved on time.

The initiative "goes beyond recycling to focus first on reducing wastes and reusing products, and then recycling and composting the rest," according to the Zero Waste strategic plan document. "Zero Waste works to redesign the system to mimic natural systems, recognizing that one man's trash is another man's treasure and everything is a resource for something or someone else.

"This plan defines success as reducing by 20 percent the per capita solid waste disposed to landfills by 2012, diverting 75 percent of waste from landfills by 2020, and 90 percent by 2040."

and part of our stormwater goes through our Bergstrom Treatment plant, which we now call the Side Stream Treatment Plant.

"Water then goes through our pond system and eventually is used to irrigate about 150 acres on site. With the Class B land application and on-site irrigation, we keep our farmers happy. Even during drought conditions, we are the 'green spot' in the county."

Hornsby Bend Biosolids Management Plant, Austin, Texas

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The team at the Hornsby Bend Biosolids Management Plant includes, from left, front row: Joe Garcia, Rico Lopez, Genaro Guerrero, Elton Harris, Ash Bledsoe and Alan Nardecchia. Second row: Christopher Adams, Rudy Salinas, Tito Diaz, Isaias Salinas and Jody Slagle. Back row: John Pino, Steven Carleton, Billy Govro and Gerald Hicks. On ladder, lower: Rene Morales; upper: Gerardo Castorena and Agmed Weber.

The old 14-acre concrete pad is

now used for compost curing and screening and for loading customers' trucks. Also on that pad is a newly remodeled structure containing three new belt presses (Alfa Laval Ashbrook Simon-Hartley) that dewater digested biosolids to 18 to 20 percent solids. Space has been allocated for a fourth press.

#### **DIGESTION RE-IMAGINED**

The bulk of the federal stimulus funds went to a major upgrade of the plant's eight 2-million-gallon digesters, split into two complexes of four units each. The aims were to increase energy efficiency, expand capacity and increase biogas generation. "The digesters were operating at about half their capacity," recalls Fred Ramirez, facilities engineer. "There was so much buildup at the bottoms that we were only able to use the top half. They had floating covers that were corroding. They were not being well-heated or well-mixed."

Contractor Parker Ag Services cleaned out some 25 years of sediment. Two sludge holding tanks were structurally relined and the digester interiors

recoated. Gravity belt thickeners (Alfa Laval Ashbrook Simon-Hartley) were updated with new controls and an automated polymer feed system ahead of the digesters.

Old mixing systems in each digester that drew 125 hp were replaced with 20 hp LM (Linear Motion) mixers (Ovivo). Fixed digester covers replaced the floating covers and a dual-membrane gas holder (Evoqua Water Technologies) were added to increase biogas storage capacity.

#### **PROCESS INGENUITY**

Process changes have also enhanced performance. Two old digesters that receive sludge from the pipeline were reconfigured long ago as a flow equalization basin and blending tank, and were recently fitted with LM. "Our operators noticed an almost immediate improvement in sludge quality," says Ramirez. "We are getting a much more homogeneous material than before."

Ferric chloride for odor control is fed into the material at the screens upstream from the equalization basin, a concession to housing developments already built and being planned near Hornsby Bend.

The operation of the digesters themselves has also changed: Three units in each complex now serve as primary digesters and the fourth (secondary)

"We haven't discharged at Hornsby Bend for over 25 years." KEN LOCKARD unit receives material from the other three before it is sent to the belt presses. "We continuously feed the primary digesters on a twohour cycle," says Lockard. "That is, we feed one tank for two hours, then move to second for two hours, and so on.

"The primary tanks are full at all times. There is an overflow mechanism so that when we're feeding, material flows to the secondary digester, which acts as a gas holder and is our main gas production tank." Total retention time is 23 to 25 days.

The improvement in performance has been notable. "The primary/secondary treatment configuration enables the acid phase and gas-producing phase of digestion to be better separated. That means we get more gas, and better solids destruction," Lockard says.

"Before, we were running all eight digesters and only getting volatile solids reduction percentages in the low 40s. Recently, because of construction issues on the site, we have been running only one complex of four digesters, yet we're handling the same or slightly more flow. Volatile solids reduction percentage is now in the upper 50s to low 60s, depending on the season — a little higher in summer. Gas production has increased from 500,000 to more than 700,000 standard cubic feet per day. So all signs indicate that everything is working the way we intended."

#### FUEL IN ABUNDANCE

The increase in biogas is part of the impetus behind a second \$5.3 million stimulus project funded by the U.S. Department of Energy, Austin Energy and the Austin Water Utility to install an 848 kWh engine-generator unit (GE Energy). Other parts of the project include upgrades to gas conditioning, hot water piping, and electrical and instrumentation systems and controls.

Cogeneration at Hornsby Bend goes back to the late 1980s with installation of two 400 kWh diesel engine-generators converted to burn digester gas. Fuel impurities severely limited those engines' performance, most notably siloxanes, which are compounds of silicon found in cosmetics and personalcare products that can form hard, ceramic-like deposits on internal engine components during the heat of combustion.

The new system is specially designed to burn biogas and includes a fuel conditioning system that removes siloxanes, moisture and acid-forming sulfur compounds before they reach the engine. As a result, the system operates continuously at full load. Heat recovered from the engine exhaust and fluids provides heat for the digesters; biogas-fueled boilers provide supplemental heat in winter. About half the facility's biogas serves as fuel, and the balance is flared for now.



Elton Harris, operations and maintenance technician assistant, makes the rounds collecting samples at the dewatering facility.

The electricity is fed directly to the local utility grid. In return the city receives a credit against Hornsby Bend's daily consumption (typical demand is about 500 kWh) and monetary payments per kWh for the balance.

#### SUSTAINABLE FUTURE

The facility, equipment and process enhancements have positioned Hornsby Bend for more resource recovery in years to come. An on-going master planning process helps the team look several years down the road at potential projects.

One of these aligns with the city's desire to remove food and other organic materials from the waste stream going to landfill. "We're looking at the possibility of building a FOG receiving station on site," says Lockard. "FOG is certainly amenable to anaerobic digestion. It would add very little complexity to the operation of our digesters but would further improve volatile solids reduction and produce significantly more gas." Greater gas production, in turn, could make it feasible either to generate more power or fuel a biosolids dryer.

"The point is that these possibilities exist because of the stimulus project and the digester improvements," Lockard says. "We couldn't have even considered these things without that. We've set ourselves up in a good place to bring about a new era of resource reuse and sustainability for the city of Austin." **tpo** 

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# MCRT, SRT, DSRT: What's It All About?

UNDERSTANDING THESE 'ALPHABET SOUP' PARAMETERS CAN HELP YOU MAINTAIN BETTER CONTROL OF AN ACTIVATED SLUDGE TREATMENT PROCESS

#### By Ron Trygar, CET

id you ever wonder why there are so many names for what is basically the same thing? I did. Our industry is full of acronyms and abbreviated names of things. Take for example the acronyms MCRT, SRT and DSRT.

As a trainee years ago, I asked my licensed co-workers what these terms meant, and I received many different and sometimes colorful answers. By far the most common responses were "I don't know," "Go look it up," and "Why do you ask so many questions?" Let's look at these acronyms, what they mean, and why they're important in the quest to control the activated sludge treatment process.

#### VARIATIONS ON A THEME

In MCRT, the M is for "mean," which is a substitute for "average." The remaining letters, CRT, represent cell residence time — how long a particular bacterial cell, or a pound of bacteria, remains in the activated sludge secondary treatment train. MCRT is normally expressed in days.

SRT — solids retention time — is sometimes used as a synonym for MCRT. They typically mean the same thing, but they may be calculated using different pieces of data. SRT can be viewed as the total mass of the solids in the treatment system, whereas MCRT is the mass of the bacteria in the system. SRT is also expressed in days.

In essence, MCRT would be calculated with the volatile suspended solids (VSS) values (for example, mixed liquor VSS, effluent VSS, waste sludge VSS), whereas SRT would be calculated using the total suspended solids (TSS) values (for example, mixed liquor TSS, effluent TSS, waste sludge TSS).

DSRT is the acronym for dynamic solids retention time — about which, more later. For now, let's focus on MCRT and SRT.

Knowing the best MCRT or SRT for your plant when it is running its best can be a real asset when you find it running poorly and need some answers for making corrective action decisions.

#### TAKING THE MEASURE

Various reference manuals explain methods of calculating MCRT and SRT. One alternative for calculation is to include the solids in the secondary clarifiers. If a treatment facility has multiple clarifiers and carries a high sludge blanket (greater than 3 feet) in each, then accounting for the solids in the clarifiers can become important for accurate mass balance process control approaches. Looking at the calculation for MCRT and SRT reveals how closely related these two are:

MCRT/SRT (Days) = Pounds of Solids Under Aeration

(Pounds per Day of Solids in effluent) + (Pounds per Day of Solids Wasted from System)

In practice, how do you measure MCRT or SRT? First, to obtain each clarifier's total suspended solids amounts, use a core sampler (Sludge Judge is one brand-name device) to take a routine sludge blanket depth reading. Do not empty the core sampler contents back into the clarifier — instead place it into a clean bucket (both sludge and water) and mix well. Then collect a portion in a sample container. After performing a TSS analysis on the sample, you will know the milligram per liter (mg/L) value of solids in the clarifiers. You can then calculate the total pounds of solids in the facility.

#### WHAT TO INCLUDE

Bacteria in the treatment system do the work of capturing suspended and dissolved solids and organic material and converting them into new cell mass that will settle in the clarifiers. They exit the treatment system by one of three methods:

- By way of waste activated sludge flowing out of the secondary process to digesters or other treatment units.
- By "jumping over the weirs" of the final clarifiers and exiting with the plant effluent flow.
- Through endogenous respiration the decomposition of the bacteria (death) into more simple compounds (CO<sub>2</sub>, H<sub>2</sub>O, energy). Endogenous respiration is common in extended aeration activated sludge treatment modes and aerobic sludge digesters.

MCRT and SRT are mathematical calculations used to describe how long bacteria are in the system before they leave the plant via one of the first two methods listed above.

If a wastewater treatment plant is running well, experiencing very few times where suspended solids actually leave the plant, the operator may choose to exclude the minimal pounds of effluent TSS portion of the MCRT/SRT calculation and just use the wasted solids pounds. This makes the calculation simpler.

One disadvantage of using MCRT/SRT is the daily flow variations experienced at some treatment plants. When calculating MCRT/SRT, the daily flow rates of plant effluent and waste sludge are important values. But what if a facility does not waste sludge every day? Some plants waste sludge just a few times per week.

To help make the calculations a little easier to use in process con-

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trol decisions and operation of a facility, you might use moving averages to smooth out the data, especially if using trend charts or computer-based trending software. A moving average is simply the daily data averaged over a period of time, commonly 5, 7 or 14 days. This helps alleviate upward or downward swings in data that is trended over time, especially waste sludge flow rates.

The accompanying graph shows very high spikes in the SRT value. These represent days where no wasting of sludge occurred and the SRT value increased by more than 20 days in just one day. This of course doesn't make sense, and the moving average helps eliminate such error when trending the data.

#### A LOOK AT DSRT

DSRT, an alternate method of sludge age calculation that has been discussed in the wastewater process engineering community, is a more accurate method of accounting for the total biomass produced and removed from the system each day. The DSRT sludge age calculation includes the amount of solids wasted from the system, but also includes the solids entering the system and possibly the amount of new solids produced in the facility on a daily basis. DSRT could include information such as influent BOD, TSS and VSS in the calculation.

DSRT has been used to help establish process control methods where sludge age is critical in determining the minimum amount of MLSS needed to provide nitrification of ammonia and meet regulatory nitrogen discharge limits

One disadvantage of DSRT is that it incorporates more data than MCRT or SRT, and this data may be difficult or expensive to obtain from the lab. Of course, this depends on your individual situation and laboratory budgets.

In summary, MCRT, SRT and DSRT can be very useful process control tools for operators of activated sludge treatment plants. Knowing the best MCRT or SRT for your plant when it is running its best can be a real asset when you find it running poorly and need some answers for making corrective action decisions.

Whichever method you choose, remember that the information it provides can only be as accurate as the information it receives from you. Representative sampling, accurate flow measurement, proper laboratory procedures and precise calculations are essential with these and any process control methods you use at your plant. For more information about these or other process control methods, please feel free to contact me via email anytime.

Ron Trygar is senior training specialist in water and wastewater at the University of Florida TREEO Center and a certified environmental trainer (CET). He can be reached at rtrygar@treeo.ufl.edu. tpo



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# **Exciting Times**

THE WATER ENVIRONMENT FEDERATION'S NEW EXECUTIVE DIRECTOR GIVES HIGH PRIORITY TO RAISING AWARENESS OF THE IMPORTANCE OF INFRASTRUCTURE AND THE VALUE OF WATER PROFESSIONALS

#### By Ted J. Rulseh



Eileen O'Neill

**E** ileen O'Neill has worn many hats in her career: soil scientist, college professor, consultant to the U.S. EPA, hazardous waste cleanup specialist. The hats that fit her best of all have to do with water and the water profession.

After more than 20 years with the Water Environment Federation (WEF), O'Neill became executive director last February. She now leads an international organization of some 36,000 water-quality professionals.

O'Neill's previous work with WEF included oversight of the federation's technical, international and publications programs and serving as

chief technical officer. She became deputy executive director in 2011 and interim executive director in mid-2013. She holds a bachelor's degree in soil science from the University of Newcastle-upon-Tyne, England, and a Ph.D. in soil science from the University of Aberdeen, Scotland. She also undertook a post-doctoral traineeship in environmental toxicology at the University of Wisconsin-Madison.

O'Neill, a strong advocate for water and the water professions, sees challenging but exciting times ahead for the industry. Among the federation's and her own priorities are to raise awareness of the value of water and the importance of water infrastructure investment, and to elevate the stature of the people who make clean-water systems work. She talked about her background and her vision for water professions in an interview with *Treatment Plant Operator*.

#### **tpo**: What was your professional background before you joined WEF?

**O'Neill:** I was a professor and lecturer at a Seale-Hayne College, an agricultural college in the United Kingdom that is now part of the University of Plymouth. I also worked for a government contractor that provided support to the U.S. EPA, and for two environmental consulting companies.

#### **LDO**: What led you to a career with WEF?

**O'Neill:** I had been aware of the federation since I entered the environmental field. I was working on corporate environmental support and hazardous waste site clean ups, my children were very young, and the no-notice travel that comes with the consulting life made me want at least a temporary career change.

So I came on board for that reason, and have stayed because working in water has been so rewarding and has provided me with all kinds of opportunities. It has been an incredible experience working with water professionals from the U.S. and all over the world. If they're active in WEF, it's because they're passionate about water, their careers and their professional development. So it's been a very rewarding place to work.



The WEF created this salute to water and wastewater crews as something utilities can circulate on social media to gain recognition for their teams.

#### **tpo**: What do you find exciting about the water industry?

**O'Neill:** Where do I start? It's such an exciting time to be in water, because of the challenges we face with population growth, climate change and urbanization, and because water is such a fundamental need. It's a very important area to work in, and while there are many challenges, it's also a time of incredible opportunity as we explore more holistic approaches to water management and water services.

## **LPD**: How would you outline WEF's critical priorities over the next several years?

**O'Neill:** We have a relatively new strategic direction and that is guiding us in three areas.

First is our fundamental mission, which is to enrich the expertise of water professionals. We really believe the role they play is vital.

Second is to help drive innovation in the water sector. If we were starting all over to install wastewater and water infrastructure, how would we approach it now as opposed to 50 years ago? And how might we integrate some of that new thinking into cities' existing infrastructure? And then there's the opportunity to recover resources — water, nutrients, energy, organic matter — while treating wastewater.

Third is to raise awareness of the value of water, in terms of helping water professionals and the water sector, but also in terms of helping communities understand the value of water and the importance of investment in water infrastructure.

**LPO**: Practically speaking, how does WEF enrich its state and regional Member Associations and the individual clean-water professionals?

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**O'Neill:** I like to think of us as an organization that operates for our members, but also with our members. We need to stay connected to practicing professionals so that we understand their needs and can fully tap into their expertise. We offer venues such as our conferences where they can network and exchange information and experience. We also advocate high standards of professional practice, certification and training.

We have expert committees that help guide everything we do. We have processes to make sure that the information we provide is of the highest quality and that the consensus of the profession is developed in a balanced and objective way. We also work with our Member Associations, which in many cases are the most accessible sources of development for local professionals.

## **tpo**: In relatively recent years, WEF has expanded its international focus. Why do you see that as important?

**O'Neill:** I have noticed over my WEF career that our members are increasingly interested not just in what's happening locally or nationally. They have a much more global perspective than ever before. They understand that what happens in, say, Singapore or Australia, in terms of technology or best practices, can provide useful insights no matter where they are.

So increasingly we are working to be a conduit for information and approaches that can be shared not just nationally but globally. We do that in part through our annual WEFTEC conference, which last year in Chicago had the highest number of attendees ever from outside the U.S. It is valuable when people can hear perspectives from water managers and water professionals from all over the world without having to leave the country.

# **tpo**: It's well known that many experienced wastewater operators will soon retire and need to be replaced. What is happening with WEF's Work for Water initiative?

**O'Neill:** We're still working on that with the American Water Works Association, and we're talking to utility directors about what they need and seeing how we can partner with them. We continue working to raise awareness of the value of water professionals, and we've been encouraging them to tell their stories — how they came to work in water and what it means to them. We have a number of programs that aim to engage young people in water-related professions and to show them that there are good careers in the water sector.

#### **LDO**: How does WEF foster innovation in the profession?

O'Neill: We're doing a range of things. We're partnering with organiza-

tions like Imagine H2O and BlueTech Research, two entities that identify promising new technologies, and we're making sure we showcase those at WEFTEC each year so that our members can see them.

Another initiative, with our Water Environment Research Foundation [WERF], is called LIFT [Leaders Innovation Forum for Technology]. One component of

that is a way to allow utilities to share the cost and risk of investment in pilottesting of new technologies. If there's a technology that utilities are interested in, rather than pilot-test it several places, maybe there's a way to pool funds and have one pilot test at a lower cost.

The LIFT program is also starting to go out and look for promising new technologies. There's a "pull" side where utilities tell us they want to work with and test a given technology. There's also a "push" side, where we looking at ways to bring technologies to utilities in areas we know are of interest to them. We also plan to convene a series of events that look at the barriers to introducing new technologies, and having conversations about ways to break the barriers down.

 designed to make the point that operators can be innovators, too. It's a lot of fun, and we see some very clever ideas. During my work with international groups at WEF, I've seen terrific ideas coming from countries that don't have as many resources as we have here. It's great to see through this contest that our operators in the U.S. are every bit as ingenious.

## **GPO**: Please describe how WEF is working to advance the profession and speak up for infrastructure.

**O'Neill:** We work with the Value of Water Coalition [of leading water associations and businesses] to work toward speaking more with one voice as a sector. We've been hearing from utility managers that they are under pressure to show how investments in infrastructure benefit local communities. So we're looking to develop that kind of information.

A principle is to amplify WEF's voice by working with others, through collaboration with entities such as the Value of Water Coalition. We are also working to coordinate with other water organizations when we are being advocates for infrastructure.

We're collaborating with WERF, the National Association of Clean Water Agencies, and others so that over time we will have what we want to call Water Week, where all the water organizations are doing their outreach on Capitol Hill, to emphasize how much we share in our support for water. We have many common messages and goals around the value of water.

## **CPD**: What does the federation do to help local operators reach out to their communities?

**O'Neill:** Through the Value of Water Coalition, we plan to create toolkits, fact sheets, public service advertisements, and other things local treatment plants and managers can use. One of our members saw a message on social media thanking electrical workers — the linemen who work through storms to make sure power gets restored. She asked us to do something similar for water and wastewater professionals, and we did. It's not branded by us. It's just something that can be shared, say, on Facebook or Twitter to raise awareness of what water professionals do to provide an essential service.

**CPO**: A hot topic today is the trouble caused by wipes products that people flush. How is the federation taking action on this issue?

**O'Neill:** We are working on several fronts. We have our own public education materials, trying to raise awareness among the public and give our members tools they can use to get the word out that, as our brochure says, "It's a toilet, not a trash can." We also provided a small amount of funding to

"[Our members] have a much more global perspective than ever before. They understand that what happens in, say, Singapore or Australia can provide useful insights no matter where they are." ELLEEN O'NEILL

> support a pilot program in Maine to help them develop some public education materials, with the understanding that they could be shared.

> We're in discussions with NACWA, the American Public Works Association and INDA, the trade association for the wipes industry, about a process to consult with them on testing for flushability and guidelines for product labeling. It's complex. It's not just an issue of labeling what is flushable and non-flushable. It's also about making sure that as little as possible gets flushed.

#### **tpo**: What final words of encouragement would you offer to the operator community?

**O'Neill:** I would urge them to continue taking pride in what they do and to remember the big picture — the importance of the work they do every day. We had a video at our opening general session at WEFTEC last year where we asked water professionals to tell their stories. This year, we want to highlight the diversity of our professionals and the diversity of careers available in water. We also want to encourage those professionals to come out from behind the scenes and engage with the public. **tpo** 

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The mixers were installed as part of a retrofit project to solve short-circuiting problems and help meet discharge limits.

# **Mixing Mastery**

SOLAR-POWERED MIXERS HELP A SMALL LAGOON TREATMENT PLANT MEET BOD AND TSS LIMITS, SOLVE SHORT-CIRCUITING PROBLEMS AND MINIMIZE NUISANCE ODORS

By Patrick J. Schnaidt

he 100-acre facultative lagoon system at the wastewater treatment plant in Iola, Kan., was big enough to serve the population of about 5,700 and a candy manufacturer.

However, the design used only about a third of each cell, and over time various water-quality issues accumulated, starting with short-circuiting. A lagoon retrofit in 2007 brought the system under control and in compliance without high-horsepower equipment. Instead, 11 SolarBee mixers (Medora Corporation) thoroughly agitate the cells, helping the plant meet BOD and TSS discharge limits, while preventing odors in spring when the cells turn over.

#### HYDRAULIC CIRCULATION

"Along with short circuiting, we had poor dissolved oxygen distribution and uneven TSS buildup," says Toby Ross, wastewater superintendent. "To solve the problem, we first tried a wetland pilot plant to reduce our BOD and TSS, but it was too small and didn't make an impact."

"We wanted mixing in the cells, but we didn't want the additional costs of wiring all of the mixers in. SolarBee gave us the mixing we wanted by using the sun to power the units."

#### TOBY ROSS

The solution lay in improving the system's efficiency by taking advantage of the large lagoon volumes. Without changing the plant's capacity, engineers recommended adding an equalization basin in front of the lagoons to bring in diffused air and increase dissolved oxygen. From the equalization basin, wastewater flows through the threecell lagoon system, which comprises about 100 surface acres with an operating volume of 157 million gallons and an operating depth of about five feet. Influent and effluent piping was changed to use the entire cell. Before discharge, water flows through a final polishing cell, where a cover was added to block out sunlight and kill off algae, and baffles lengthen the hydraulic detention time.

Within the lagoon system, six solar mixers are installed in Cell 1, three in Cell 2, and two in Cell 3. The units improve hydraulic circulation and mixing in the cells, reducing short-circuiting and improving dissolved oxygen and suspended solids distribution.

#### **DRIVEN BY THE SUN**

"The engineers recommended the mixing units," says Ross. "We wanted mixing in the cells, but we didn't want the additional costs of wiring all of the mixers in. SolarBee gave us the mixing we wanted by using the sun to power the units." The mixers provide the required

mixing despite large BOD loading from the candy plant, which accounts for about half of the lagoons' BOD.

The mixers take advantage of the way water forms thin horizontal layers in all reservoirs. They pull in water at the desired depth from all corners of the lagoon and provide

efficient mixing that distributes dissolved oxygen evenly throughout the mixed depth.

The mixers also help reduce odors when the lagoons turn over twice a year. "Before the upgrade, the odor was horrible in town," says Ross. "Because the lagoons are located south of town and the wind is

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Solar-powered mixers improve hydraulic circulation and mixing in the cells at the Iola (Kan.) Wastewater Treatment Plant.

usually out of the south, all the odors were blown right into town. Since the upgrade the lagoons still turn over twice a year, but the odor is minimal."

In addition, the mixers make the superintendent's job easier by helping the plant comply with its permit. Says Ross, "The discharge limits are 30 mg/L for BOD and 80 mg/L for TSS. We have met those limits ever since the upgrade."

## ABOUT THE AUTHOR

Patrick Schnaidt is vice president of marketing for Medora Corporation, a provider of sustainable reservoir water-quality improvement technologies with low energy or chemical use, based in Dickinson, N.D. He can be reached at pat.s@medoraco.com. tpo

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## Odor Control and Disinfection

By Craig Mandli

Odor control is essential to ensuring that wastewater treatment facilities remain good neighbors. Disinfection is essential to protecting public health. Here are some of the latest technologies in both product areas.

## **Activated Carbon Systems**

## ODOR-ABSORBING ACTIVATED CARBON

AddSorb OX30 activated carbon from Jacobi Carbons controls odors such as hydrogen sulfide, mercaptans, methyl sulfides and VOCs from air emissions. Made from sustainable raw materials as an extruded pellet, it has high  $H_2S$ -capacity product while maintaining VOC adsorption capabilities. The pelletized form affords a low pressure drop and is free of chemical impregnants, ensuring thermal stability in sensitive applications. **215/546-3900; www.jacobi.net**.



## POWDER-ACTIVATED CARBON FEEDER

The VF-100 powdered activated carbon (PAC) feeder from Eagle Microsystems is constructed of stainless steel and uses a direct drive. It can be optimized for any PAC application with options like dust collectors, flex-wall agitation, explosion-proof motors, wetting cones, solution tanks, flow-pacing control, extension hoppers, and multiple screw and

VF-100 powdered activated carbon (PAC) feeder from Eagle Microsystems extension hoppers, and multiple screw and motor ranges to accommodate any feed rate. The chemical feed rate is controlled by electronic SCR speed control. **610/323-2250**;

www.eaglemicrosystems.com.

## **Aeration Equipment**

## **AERATION UNITS**

Venturi Aeration units not only oxidize sulfides into non-odorous sulfate, but condition organic materials while in the collection system. A side stream entering a lift station in the collection system is pumped through an aerator device and discharges a highly aerated wastewater back into the lift



Aeration units from Venturi Aeration

station. The unit breaks up clumps of organic materials, making them more bioavailable for digestion; degasses organic solids oxidizing hydrogen sulfide; scrubs corrosive  $H_2S$  in the headspace of the wetwell; adds dissolved oxygen to begin reducing BOD prior to the headworks; and strips  $CO_2$  buffering pH in relation to alkalinity present. **603/635-8239; www.venturi-aeration.com.** 

## **Biofiltration**

## **BIOFILTRATION SYSTEM**

The Compact Monafil zero-energy biofiltration system from Anua



Compact Monafil biofiltration system from Anua uses specialized media to remove odors, VOCs and sulfur- and nitrogen-based compounds. The properties of the granular, high-density peat media help achieve high-performance removal and extended media life. It uses recycled shell-based media to maintain a neutral pH within the

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## HEPA FILTER PACKS

HEPA filter packs from HEMCO Corporation collect particulate contaminants from the exhaust air stream. They remove 99.999 percent of particulate 0.3 micron and larger. The filter pack housing has a hinged access door with gaskets and spring latches for easy filter

change. Inlet and outlet plenums with duct



HEPA filter packs from HEMCO Corporation

connection collars are installed. Packs can be paired with a carbon filter pack to remove chemical fumes and odors. **800/779-4362; www. hemcocorp.com.** 



## **BIOTRICKLING FILTER**

Biotrickling filters from BioAir Solutions offer a biological process that utilizes engineered, structured synthetic media to provide an optimal environment on which biological microorganisms can attach and grow to help remove both organic and inorganic odorous compounds. All odorous compounds are degraded and converted naturally and autonomously by the microorganisms present

Biotrickling filters from BioAir Solutions

within the system. The drain discharge can usually be blended with other wastewater sources present at the site. **856/258-6969;** 

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The Biological Air Treater (BAT) system from Purafil provides efficient and cost-effective odor abatement with effective hydrogen sulfide and VOC treatment. Its dual-phase bio-support structure prevents plugging and channeling, providing a low pressure drop and requiring minimal maintenance. The technology includes a fully optimized and tunable support structure, providing wet-



Biological Air Treater (BAT) system from Purafil

loading and removal capacities. The fixed-film biotrickling filter technology is effective and economical in varied applications. **770/662-8545; www.purafil.com.** 



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es ty gg nn-

mable and noncaustic. The product contains no VOCs and no harmful or ozone-depleting chemicals. **888/866-6367; www.noodor.com.** 

Smelleze chemical odorremoval pouches from Imtek Environmental Corp.

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areas. 609/386-8770; www.ipcol.com.

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product and equipment. 800/662-6367; www.omi-industries.com.



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C-5 Odor Neutralizer from Martech Research can be used to control noxious odors and  $H_2S$  gas. It uses a formulation of natural botanicals, enzymes and microbes to change the biochemical pathways that lead to the formation of odors, destroying them at the source. It can be used in liquid or a

C-5 Odor Neutralizer from Martech Research

**izer slow-release** block to control odors in a wide range of wastewater collection and treatment

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Longofill continuous bag system from Paxxo odors are trapped inside, cutting down development of bacteria and fungus spores. **770/502-0055; www.paxxo.us.** 

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The Q45S odor-monitoring system from Analytical Technology allows measurements at the inlet to scrubber systems where concentrations can run as high as 200 ppm, or at the **O45S odor-monitoring system** from Analytical Technology

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## product focus Odor Control and Disinfection

streams with condensing levels of water vapor, provision is made to eliminate water droplets from the sensor that could impede the diffusion of  $H_2S$ . An optional air-purge system controlled by the transmitter periodically delivers a blast of air across the critical sensor surfaces to remove water droplets. **800/959-0299; www.analyticaltechnology.com**.

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Type 8202 transmitter from Burkert Fluid Control Systems

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The OdoWatch Web-based software platform from Odotech measures and tracks odors and gases in real time. It can provide odor audits and studies, citizen observations, and odor and gas dispersion modeling. It offers

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OdoWatch Web-based software platform from Odotech

connected smartphone, tablet or computer. It can track and measure several gases and odors, at once or separately. The system alerts operators when odors approach threshold values, enabling them to respond before a problem occurs. **514/340-5250; www.odotech.com**.



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The iTrans 2 Stand-Alone control module from Oldham can be mounted outside the door of chlorine cylinder storage areas with single- or dual-remote chlorine sensors mounted inside, providing a warning before anyone enters the areas. It can be used at remote lift pump/ wet well stations where it is mounted on

iTrans 2 Stand-Alone control module from Oldham

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The Electronic Bed Monitor (EBM) from PureAir Filtration gives live readings of adsorbent media consumption in odor-control systems. It measures the carbon/adsorbent

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Electronic Bed Monitor (EBM) from PureAir Filtration

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Lovibond MD 100 colorimeter from Tintometer

#### GAS DETECTION DIGITAL MODBUS RTU CONTROLLER



The TA-2016MB-WM gas detection wall-mount controller from Mil-Ram Technology has a 16-channel system (eight-channel available) using an RS-485 Modbus RTU multi-drop sensor network. It has low/ mid/high/fault relays (SPDT rated 10 amp), LED alarm indicators, local buzzer and backlit

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conditions. An auto-configuration wizard

TA-2016MB-WM gas detection wall-mount controller from Mil-Ram Technology

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## PERSONAL FOUR-GAS MONITOR

The RKI GX-2009 four-gas monitor from Scantek weighs 4.6 ounces and fits in the palm of a hand. It simultaneously monitors and displays combustibles, oxygen, carbon monoxide and hydrogen sulfide. It has dual audible alarm ports and alarm LEDs on three sides so that alarm conditions are obvious in high-noise



RKI GX-2009 four-gas monitor from Scantek

environments. It has a waterproof and dustproof design with IP 67 rating, impact- and RFI-resistant rubber over-mold body and a largecapacity data logging system. Also included are vibration alarm, autocalibration, calibration lockout or reminder control, STEL/TWA readings, peak hold, and auto backlighting at alarm on a large LCD display. It is operated through two simple glow-in-the-dark, glove friendly buttons. The NiMH battery operates for 20 hours and fully charges in three hours. **800/224-3813; www.scantekinc.com.** 

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CSO Technik Terminodour odor-control system, distributed by Kusters Water

uses no water, chemicals or media, minimizing capital and operational costs. **864/576-0660; www.kusterswater.com.** 

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The PureLine UV disinfection range from Aquionics provides chemical-free disinfection of water, syrups and brines in the food, beverage and brewing industries. It includes standard models for almost any food and beverage processing application, including deozonation, dechlorination and

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The Duron open-channel UV disinfection system from WEDECO – a Xylem Brand eliminates chemical-based disinfection. Its small footprint includes a 45-degree vertical incline design combined with a vertical lamp arrange-

Duron UV disinfection system from WEDECO – a Xylem Brand ment. It uses energy-efficient 600watt Ecoray lamps and ballasts, minimizing the number of lamps

**PureLine UV disinfection** 

range from Aquionics

required. 704/409-9700; www.wedeco.com/us.

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Multiplex Systems from UV Pure Technologies

structed assemblies reduce installation time and cost and require minimal training. **888/407-9997; www.uvpure.com.** 

#### UV TRANSMITTANCE MONITOR



The Real UV254 M1500 probe from Real Tech provides accuracy and reliability in openchannel or nonpressurized wastewater UV disinfection applications. It monitors UV transmittance (UVT) between 15 and 100 percent. The

Real UV254 M1500 probe from Real Tech optional Real Controller is a wall-mounted operator interface that allows for convenient control and display. Real Air Clean

systems provide automatic air cleaning to improve performance and lower maintenance. The 4-20 mA output links real-time UVT measurements with the operator or UV reactor to enhance treatment goals while saving operator time and money. **877/779-2888; www. realtechwater.com.** 

#### PACKAGE WATER TREATMENT PLANT

The Trident HS package water treatment plant from WesTech Engineering provides multibarrier protection for difficult-to-treat surface water, groundwater, industrial process water and tertiary wastewater. It consists of packaged high-rate settling, adsorption clarifica-

tion, mixed-media filtration and optional UV disinfection. It handles high rawwater turbidity and solids loading and

Trident HS package water treatment plant from WesTech Engineering

achieves TOC reductions that can exceed 70 percent. **801/265-1000**; www.westech-inc.com. tpp



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Subscribe online at: tpomag.com By Craig Mandli

# Grid technology used to eliminate foul odor in condominium community

## Problem

DMCI Homes developed the resort-inspired Ohana Condominium Community in Arizona. The community was experiencing extreme odor pollution due to a high influent level of BOD in the community's wastewater treatment system.

## **Solution**

Based on a flow rate of 200 to 350 gpm, **Biocleaner installed a pair of two-grid units** in the two-tank wastewater treatment system, which had a hydraulic retention time of 13 hours.



#### RESULT

The odor was eliminated within three days after installation, and there was a significant reduction in BOD. The community no longer has any odor issues and no longer has to handle sludge. **323/981-0797; www.biocleaner.com.** 

# Town installs wastewater system that also generates electricity

## Problem

The northern California town of Graton needed a new wastewater disinfection system that would reduce energy costs.

## Solution

The town purchased an X-500 system from Pasteurization Technology Group (PTG). The chemical-free wastewater disinfection system

generates on-site electricity. It is part of a project to upgrade the 36-year-old wastewater treatment plant, which serves the town's 1,700 residents. At less than onetenth of the total project cost, it can process almost 600,000 gpd.

### RESULT

The system is expected to significantly reduce costs by

generating electricity at half the cost of grid power. Graton will also eliminate the costs of purchasing and storing chlorine. **510/357-0562; www.pastechgroup.com.** 

# Vapor diffusion used to treat odors at wastewater plant

## Problem

In 2012, the headworks area at the Knob Creek Wastewater Treatment Plant in Johnson City, Tenn., was identified as a potential source of fugitive

nuisance odor emissions. Albert Greenwell, the plant's operator-incharge, sought a solution.

## Solution

**BioTriad Environmental installed a VaporCom system**, composed of aluminum, polypropylene and polyethylene for durability and corrosion resistance. The system works by evap-



orating VaporScent odor neutralizer, composed of natural plant extracts. The system uses no water, synthetic fillers or inactive ingredients; it evaporates clean, will not freeze and so can operate year-round. It uses an invisible waterless vapor that neutralizes fugitive odors on contact.

### RESULT

The vapor diffusion line was mounted around all emission points in the headworks area, so any odors must pass through the neutralizing vapor. The plant received only one odor complaint in 2013, and site management is satisfied. **888/658-7423; www.biotriad.com.** 

## Disinfection program used to combat microbial odor issues

## Problem

A 15,000-gallon industrial process-cooling tower at a plastics manufacturer in Rochester, N.Y., had long-standing microbial odor issues due to a leak of lubricating oils into the cooling system.

## Solution

**EMEC** Americas introduced a disinfection program using Sanicide 2. The tower was treated for 10 minutes (approximately one system turn) three times a day at a concentration of 20 ppm.



### RESULT

Over two to three weeks, the tower was completely cleaned. Process heat exchangers that had previously clogged regularly now

function without issue, and the customer has seen a significant increase in uptime. The program was expanded to a second system on site. **978/400-5507; www.emecamericas.com.** 

# Pure oxygen system provides primary clarifier odor control

## Problem

The Anson-Madison Sanitary District in Maine treats 4 mgd of wastewater from Madison Paper Industries and the communities of Anson and Madison. The treatment facility is located close to neighbors and has been plagued by odor complaints. Wastewater entering the treatment facility is anaerobic and releases levels of hydrogen sulfide gas at an average of 150 ppm, with spikes of 800 ppm. The district began adding calcium nitrate which, while effective in controlling gas, proved too expensive.

## Solution

Woodard & Curran worked with **ECO Oxygen Technolo**gies to design a **SuperOxygen**ation **System** for the primary clarifiers. The goal was to eliminate hydrogen sulfide formation, reduce operating costs and eliminate use of chemicals.



### RESULT

Since it was installed in 2012, the system efficiently adds sufficient pure oxygen to maintain aerobic conditions through the primary clarifiers, preventing hydrogen sulfide formation. The odors have been eliminated, and the district is saving substantial costs. **317/706-6484; www.eco2tech.com.** 

# **Compact self-cleaning UV system effectively treats meat-processing wastewater**

## Problem

High-strength organic loads (up to 820 mg/L CBOD<sub>5</sub>, 200 mg/L TSS and 86 mg/L oil and grease) generated by Loblaws' Atlantic Superstore in Upper Tantallon, Nova Scotia, required the highest level of disinfection to treat up to 4,750 gpd of wastewater.

## Solution

The engineering firm F. Meloche Ingénieurs, recommended the **Segflo recirculating biotower and Ecoflex polishing biofilter from Premier Tech Aqua**, combined with a Hallett 30 tertiary treatment unit from UV Pure for the final



stage of effluent disinfection. The system effectively treats flows up to 1 mgd of low-quality (low UV transmittance) wastewater. It prevents operator exposure to wastewater since no manual quartz sleeve cleaning is required.

#### RESULT

After three years, the treatment station continually meets strict effluent quality requirements, including less than 5 mg/L CBOD<sub>5</sub>, less than 7 mg/L TSS, 7.1 pH and 5 cfu/100 mL fecal coliform. **800/632-6356; www.premiertechaqua.com.** 

## Auto-optimized dosing system addresses odor issue

## Problem

The Town of Palm Beach, Fla., needed an optimized treatment system for fluctuating force main flows and dissolved sulfide levels at one of its lift stations.

## Solution

The town selected Kemira's Advanced Remote Contaminant Control and Monitoring Technology (RCCMT), a smart technology that uses real-time influent dissolved-sulfide data to consistently auto-optimize a correct chemical dosage on a weight-for-weight basis, taking into account wastewater flow, temperature and pH.

### RESULT

The remotely operated system has lowered overall chemical usage, increased response time, and maintained a consistent level of less than 5 mg/L total dissolved sulfides leaving the injection site. **480/227-4848; www.kemira.com.** 



## Cover system helps city control wastewater odors

## Problem

The City of Tulare, Calif., is home to six major dairy producers that send large volumes of high-strength wastewater for treatment. The Board of Public Utilities (BPU) and the city council needed to control odors at the treatment plant.

## Solution

Geomembrane Technologies designed, manufactured and installed a floating gas-collection cover over the complete 4-acre surface of the city's ADI-BVF anaerobic digester. The cover



is chemical- and UV-resistant to withstand the tough environment of the digester and the California sun. Personnel can walk across the reactor for operations and maintenance, yet the cover is gastight so that it eliminates odors.

## RESULT

The cover collects up to 600,000 cubic feet of biogas per day, enough to generate a significant portion of the plant's power and reducing reliance on the utility grid. The cover also contains odors and reduces greenhouse gas emissions. **855/484-4630; www.gticovers.com.** 

## Biological treatment used to desludge lagoon

## Problem

Sludge in Pond No. 1 of a city in Illinois was taking up treatment capacity and causing odors, accumulating to the point where part of the sludge blanket was exposed to the surface, allowing odors to escape. State regulators were also demanding improvements because BOD5 test results were too high.

## Solution

The city decided to solve these problems by desludging their lagoons with **BIO ENERGIZER** from Probiotic Solutions.

## RESULT

After 14 months of treatment, 70 percent of the sludge blanket was removed. "Prior to

using BIO ENERGIZER, half my lagoon capacity was lost to sludge. Sludge depth averaged 41 inches," says the city's wastewater superintendent. "After using BIO ENERGIZER my average sludge depth dropped to 12 inches." **800/961-1220; www.probiotic.com.** 



# Mixer stops grease buildup, related odors at pumping station

## Problem

The city of Darien, Conn., operates a pumping station to send wastewater to the treatment plant in neighboring Stamford. The station operates within a narrow depth range, with a transducer to signal for pumps to come on and off and floats to back up the transducer. The station had seen heavy grease buildup, sometimes over a foot deep and hard enough to stand on. This fouled the transducer and floats. The operators tried chemicals and mechanical mixers to no avail. Pumping the grease out cost \$1,800 per episode.

## Solution

Darien installed a **PHi one-valve mixer along with an air compressor with receiver tank from Pulsed Hydraulics.** The mixing system uses pulses of compressed air to break up grease and prevent formation of grease caps.



### RESULT

Started up after grease removal, the mixer runs 24 hours a day and keeps the grease cap from reforming. Operators are satisfied with the solution, especially the elimination of odor during pumping. **800/641-1726; www.phiwater.com.** 

## Odor control cover needed for large UV basin

## Problem

The city of Oconomowoc, Wis., recently completed a \$7.2 million expansion of its 37-year-old wastewater treatment facility. Improvements included adding a secondary clarifier, replacing a chlorine disinfection system with UV and increasing biosolids storage. This extended the facility's lifespan while doubling capacity to 5.5 mgd for some of the major plant components. The city needed odor control infrastructure to meet the increased capacity.

## Solution

Engineers at Donohue and Associates specified **Strongwell products** for three key portions of this project: basin covers, walkways and stairways. COMPOSOLITE was used to make the covers for the large UV basin (20 by 50 feet), with some panels spanning 24 by 60 inches. Each cover panel includes lift handle for easy removal and replacement.



#### RESULT

STAAB Construction was pleased with the ease and speed of the installation process. **276/645-8000; www.strongwell.com.** 

# Plant tests reinforce peracetic acid's high success rate in wastewater treatment

## Problem

A wastewater treatment plant in Steubenville, Ohio, needed a cost-effective disinfection method that would not generate chlorinated byproducts.

## Solution

**Solvay Chemicals conducted independent plant-scale trials using Proxitane WW-12 peracetic acid (PAA)** over a little more than one month. PAA, a rapidly acting disinfectant, generates no disinfection

byproducts even if overdosed. The dosing system can be economically retrofitted or work in series with an existing disinfection system. The plant was operating at 5 to 8 mgd, with a design capacity of 13.5 mgd.



The test was success-

RESULT

ful. PAA dosage never exceeded 1.5 ppm, and the residual chlorine averaged 0.4 ppm, never exceeding 1 ppm. PAA feed was flow-paced, CBOD remained constant and pathogen control was always within the permit limits. **800/765-8292; www.solvaychemicals.us.** 

## Upgrade enhances disinfection and odor control

## Problem

To meet the projected population increase from 1,160,000 people currently to an estimated 1,571,000 people in 2031, the Region of Peel in Ontario needed to upgrade and expand its Lorne Park Water Treatment Plant.

## Solution

For the membrane treatment train, the **TrojanUVSwift ECT UV-oxidation system** was selected to not only eliminate chlorine-resistant protozoa but to also destroy seasonal odor-causing compounds. It was selected because it offered flexible operation, guaranteed performance and required a small footprint.



## RESULT

The Lorne Park Water Treatment Plant is now home to the largest municipal UV-oxidation installation for odor removal in North America. The plant upgrade was named 2013 Project of the Year by the Ontario Public Works Association. **519/457-3400; www.trojanuv.com. tpo** 

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# **How Ingenious Are You?**

WEFTEC WANTS TO SHOWCASE CLEAN-WATER OPERATORS' CLEVER MONEY-SAVING, LABOR-SAVING, PERFORMANCE-BOOSTING IDEAS

### By Ted J. Rulseh

So you found a \$5,000 fix for an odor problem that an engineer said would cost \$50,000 to correct. Or you corrected a pesky chemical feed problem with a few dollars' worth of fasteners and a length of PVC pipe. If you've ever worked this kind of miracle, the Water Environment Federation would like to recognize you. WEFTEC 2014 in New Orleans Sept. 27-Oct. 1 will include the **third annual Ingenuity Contest**.

It's a fun competition that recognizes innovations that come not from research labs, but from the minds of clean-water operators and teams. The contest will showcase ways in which operators used their imaginations to make changes in their facilities that save money, improve plant performance, eliminate wasted labor, avoid safety issues, and more.

The competition is open to clever ideas from all areas of a clean-water agency: treatment processes, collection systems, laboratory practices, storm-water management, and even administration and human resources. Selected inventors will be invited to give 10-minute presentations about their ideas.

Need a few examples to get your brain working? Here are some award winners from a previous ingenuity contest:

- **Safety.** A ladder extension pole quickly attaches to the rungs inside a manhole, helping operators be safer and meet safety requirements.
- **Process control.** A foot-operated sample collector pumps mixed liquor samples from beneath a foam-covered surface, eliminating heavy lifting and contamination from passing the sample through the foam.
- **Maintenance.** A PVC pipe cover for a pump's lifting chain protects the chain from being tangled with rags and other debris and enables a chain follower to operate better when the pump has to be removed.
- Work environment. Color-coded buildings beautify a facility and add a quick, easy way for visitors and contractors to navigate to the right spot.
- **Resourcefulness.** Compost heat prevents freezing of sludge lines leading to a temporary trailer-mounted dewatering unit.
- **Walking the talk.** A stormwater filter best management practice reduces TSS in the runoff leaving a facility's yard.

Do you have an idea along these general lines? Even if you're not sure it's a winner, and even if you can't make it to WEFTEC, submit it. The WEFTEC team will share your idea with many of your peers.

Put together a one-page description of the problem you faced and the fix you found. If you can send a picture of your idea, that's a plus. Submit your idea online at **www.wefnet.org/onlineform/weftec/ingenuity.** The portal is open until June 6. If you have questions, email to innovation@wef.org. **tpo** 





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## product news











## 1. WEDECO PERFORMANCE UPGRADE UV KITS

Ecoray upgrade kits from WEDECO - a Xylem Brand, reduce the energy consumption of an ultraviolet disinfection system by up to 30 percent. Kits include Wedeco Ecoray UV lamps with ballasts that enable the lamps to perform at their best for more than 14,000 hours. Sensors guarantee accurate measurements and support optimum operation. Wipers and sleeves keep the sensors free from dirt. **704/409-9700; www.wedeco.com/us.** 

## 2. NK TECHNOLOGIES APT POWER TRANSDUCERS

APT Series power transducers from NK Technologies measure three phases of current and voltage, producing an industry standard analog signal proportional to the watts used. They are externally powered, offering 4-20 mA, 0-5 VDC or 0-10 VDC output. The transducers can be configured to accept 5 A secondary current transformers or ProteCT low voltage output sensors. **800/959-4014; www.nktechnologies.com**.

## 3. PUMP SOLUTIONS GROUP AODD PUMPS

Almatec E-Series air-operated double diaphragm (AODD) pumps from Pump Solutions Group feature a plastic, solid-body design for general chemical transfer, while AH-Series AODD pumps in high-pressure configurations are designed for charging filter presses with chemical waste and sludge. **909/557-2900; www.psgdover.com.** 

#### 4. ALLEN-BRADLEY MICRO820 PLC

The Allen-Bradley Micro820 programmable logic controller from Rockwell Automation features embedded Ethernet and serial ports and microSD slot. Connected Components Workbench software simplifies the configuration, design and maintenance of the controller. **414/382-2000; www.rockwellautomation.com/industries/water.** 

## 5. ATLAS COPCO ZS OIL-FREE SCREW BLOWER

The ZS screw blower from Atlas Copco Compressors has an integrated variable-speed drive and features ISO 8573-1 Class 0 certification for 100 percent, oil-free air. **866/546-3588; www.atlascopco.com.** 

### 6. CHEMINEER STATIC MIXER

The Kenics KMX-V state mixer from Chemineer is designed for fluids with extreme viscosity or volume ratios. Features include cross-stream mixing and flow splitting for rapid blending. Other features include proprietary V-shaped blades, liquid dispersion/gas-liquid contacting, standard dimensions to 24 inches, injectors designed to optimize process and high volumetric flow ratios between mainstream and additive. **800/643-0641; www.chemineer.com.** 

## 7. GRUNDFOS SEWER CHEWER GRINDER

The Sewer Chewer grinder from Grundfos Pumps is designed for wastewater and sludge-handling systems and features a durable ductile iron frame and high-pressure pipe flanged seal. Submersible up to 90 psi, the grinder has a NEMA 4X FRP controller and PLC keypad operator interface. **800/921-7867; http://us.grundfos.com.** 

#### 8. PRIMEX WEB-BASED REMOTE MONITORING SYSTEM

The Pump Watch remote monitoring system from PRIMEX Controls enables lift stations and wastewater collection systems to be managed remotely on a PC, tablet or smartphone via a secure cellular network. Alarms are monitored and service personnel notified by email or text messaging. Data and trending can be monitored 24/7 from the website. **800/746-6287; www.primexcontrols.com.** 

#### 9. SMITH & LOVELESS NON-CLOG PUMP

The S&L Non-Clog pump from Smith & Loveless has an oversized, stainless steel pump shaft that minimizes overhang for less shaft deflection. Shaft runout is limited to 0.003 inches. The full-diameter back shroud prevents stringy material from wrapping around the shaft. **800/898-9122; www.smithandloveless.com.** 

#### **10. HACH PORTABLE DATA COLLECTION**

Support for mobile devices from Hach automatically collects data and imports it to the WIMS management system, enabling doForms and AuditMatic software to collect information from water and wastewater









processes. Data can be collected on Android, iPad and iPhone (Android and IOS operating systems) mobile devices. AuditMatic also runs on Windows Mobile hand-held computers and Windows tablets. **800/227-4224;** www.hach.com.

#### **11. ACM SAFETY MONITORING SOFTWARE**

SafeGuard Sentinel safety monitoring software from ACM Facility Safety continuously measures, monitors and alerts operations and management to process safety risks. The software also delivers contingency plans that can be immediately executed to address issues and reduce risk. The program runs on a Windows-based server in a plant network and can be accessed by any device capable of running a browser, including DCS workstations, operator terminals, tablets and smartphones. **403/264-9637; www.acm.ca.** 

#### **12. CONVEYOR COMPONENTS BELT ALIGNMENT**

The Model VA belt alignment control from Conveyor Components features a conveyor roller with sealed bearings, four bar linkage and double pole/double throw microswitch. The roller detects belt runoff and triggers the first pole of the microswitch to sound a warning alarm, illuminate an indicator light or stop the conveyor completely when the vertical belt strays beyond 10 degrees from horizontal. The second pole is triggered when the belt strays 25 degrees from horizontal and can be wired to stop the conveyor motor. **800/233-3233; www.conveyor components.com.** 

## **13. HEMCO CONTAINMENT WORK AREA**

The HazMax containment work area from HEMCO Corp. is engineered to isolate large equipment distillation procedures, pilot plant requirements, sampling, weighing and dispensing operations. The varaflow baffle system and bypass inlets safely vent vapors, odors and powders. The ventilated work area is constructed of corrosion-resistant composite resin surface panels. Other features include vapor-proof or explosion-proof lighting, secondary containment basin and raised fiber-glass grate deck floor. **800/779-4362; www.hemcocorp.com. tpo** 

## product spotlight



Vantageview series from Precision Digital Corp.

# NEMA 4X field-mounted meters keep critical data in clear view

By Ed Wodalski

The **Vantageview** series of NEMA 4X field-mounted meters from **Precision Digital Corp.** offer the functionality and features of its ProtEX explosion-proof meters in an injection-molded plastic, NEMA 4X (IP65) enclosure for protection against dirt, dust and water.

"Safe area field meters tend to be displays placed inside big, square plastic boxes, which isn't very convenient," says Joe Ryan, marketing manager for Precision Digital. "We took what we learned designing our explosion-proof enclosures and made a custom plastic housing. So what we have are the same electronics, but inside a convenient packaging for safe area applications." The packaging is also less expensive.

The Model 6700 process meter features dual-line LCD for viewing critical process variables at a distance and in direct sunlight, while the 6701 level meter displays information in feet and inches, including fractions (1/8 or 1/16 inch), along with a 20-segment tank level bar graph. The tank level indicator can be scaled independently of the analog input scale. The upper display of the PD6700 or PD6730 rate/ totalizers are 0.7 inches high and show five digits of flow rate. The lower display is 0.4 inches high and shows either flow total or a tag with seven (14 segment) alphanumeric characters.

"Generally, you're not going to get a field-mounted level display that gives the operator a clear understating in feet and inches," he says. "While I know it sounds simple, it's a lot easier for operators to understand that a tank level is 28 feet 9 inches, rather than 345 inches."

Built-in, SafeTouch through-window buttons enable the meters to be programmed and operated without opening the housing. The buttons can be disabled for security with a switch located inside the enclosure. The meters are available in 4-20 mA loop-powered and pulse input models powered by the output loop, DC or battery. The meters weigh 1.65 pounds and are 5.67 inches wide by 5.25 inches high and 4.18 inches deep. Operating and storage temperatures range from -40 to 167 degrees F (-40 to 75 degrees C).

"The two biggest applications I see for these products in wastewater treatment plants are field flow indication and tank level," Ryan says.

The PD6700 Series has a 90-degree rotatable display with an 80-degree viewing arc. All meters can be password protected and have a high or low alarm indicator that flashes a HI or LO symbol. Several have open collector output options. Three 3/4-inch, NPT-threaded conduit holes enable the meters to be wired from any direction. **800/343-1001; www.predig.com.** 

## Xylem mixers help cut treatment plant operational costs by 65 percent

Technology from Xylem Inc. reduced the energy consumption of a wastewater treatment plant in Italy by 65 percent. According to a comparison study conducted by Comopedur, which operates the plant, the company's Flygt 4530 submersible mixers have saved 50,000 euros in annual operating costs. Located in Italy's scenic Lake Como region, the plant treats 11.5 mgd, serving a population of 200,000. The new mixers, operating in a pre-denitrification tank, consume 175,000 kWh of electricity, versus 500,000 kWh for the old mixers they replaced.

## Kruger upgrades township's treatment capabilities with IFAS

Kruger, a subsidiary of Veolia Water Solutions & Technologies, won a contract with the Franklin Township Sewer Authority (FTSA) in Waynesburg, Pa., to retrofit the wastewater treatment plant with the AnoxKaldnes Integrated Fixed-Film Activated Sludge (IFAS) process. The process uses polyethylene carrier elements (media) added to the plant's aeration basins. The media provides a large surface area to which beneficial microorganisms attach, forming a biofilm that supplements the activity of the suspended microorganisms. The result is an enhanced level of treatment in the same volume of tankage. The existing facility was rated at 1.25 mgd and consisted of submerged rotating biological contactors (SRBC) for organic removal followed by aerobic activated sludge tanks for partial nitrification in summer. The expansion will increase treatment capacity to 2.0 mgd and will meet the new year-round effluent ammonia nitrogen limits at the new design loads.





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## Severn Trent wins major contract for denitrification filter technology

Severn Trent Services won a contract from Archer Western Contractors to provide its TETRA Denite denitrification filter technology to the Back River Wastewater Treatment Plant in Baltimore, Md. The fixed-film biological denitrification process will reduce high levels of nutrients discharged into the Chesapeake Bay. Upon completion, the installation will be the world's largest fixed-film denitrification system. The \$24 million project will consist of 52 filters in four sets, each set operating independently. The facility will handle the plant's permitted flow of 180 mgd. The design engineer for the project is Whitman, Requardt and Associates of Baltimore. After project completion, plant effluent will contain less than 5 mg/L TSS, less than 1.0 mg/L nitrate, less than 4.0 mg/L total nitrogen and less than 10 mg/L CBOD.

### Synagro completes major biosolids composting facility

Synagro Technologies completed construction of a \$4.3 million composting facility in Southwest Florida to process biosolids and green waste into Class AA compost. The facility will minimize environmental impact by using aerobic composting. The Class AA soil amendment will be marketed under the company's AllGro brand, designed to cost less than synthetic fertilizers and to improve the physical structure of soil by introducing organic matter.

### Victor Valley chooses Anaergia technology for MBR facilities

The Victor Valley Wastewater Reclamation Authority in Hesperia, Calif., chose the FibrePlate hybrid-membrane technology from Anaergia for two subregional membrane bioreactor (MBR) facilities. The facilities will be located in high-growth areas of the service region and produce a combined 2 mgd of high-quality effluent for landscape irrigation. Besides providing a drought-proof water supply, the MBR facilities will reduce the overall load on the collection system, enabling the authority to defer infrastructure expansion and reduce the energy costs of pumping recycled water. The FibrePlate technology combines the benefits of hollow-fiber membranes, including high packing density and backwash capability, with the low trans-membrane pressure and ease of operation of flat-sheet membranes. The results are lower capital and operating costs and high operating flexibility.

## Terratec awarded biosolids contract for Cobourg

Terratec Environmental, a division of American Water's market-based subsidiary American Water Enterprises, won a two-year, \$260,000 contract with the Town of Cobourg, Ontario, for removal and land application of biosolids. The work consists of removal, transport and land application of about 13,000 cubic yards of biosolids from the town's water pollution control plants.

## Xylem to supply UV treatment for major European wastewater treatment facility

Xylem won a \$2.75 million contract to supply Wedeco Duron UV technologies to a wastewater treatment facility in the Vigo region of southwest Spain. With a treatment capacity of 39 mgd, serving 800,000 residents, the facility will be Spain's largest biofiltration and UV plant and one of the biggest in Europe. The Wedeco Duron technology includes an inclined lamp arrangement and highly efficient 600-watt Ecoray lamps.

## Severn Trent enters partnership with Johnstown authority

The Johnstown (Pa.) Redevelopment Authority chose Severn Trent Services to provide operations and maintenance services for the Dornick Point Wastewater Treatment Plant through a public-private partnership. The five-year contract is projected to deliver nearly \$500,000 per year in cost savings. The 12 mgd plant serves about 25,000 customers in Johnstown and 19 surrounding municipalities. **tpo** 

## Action Bearing forms wastewater treatment division

Action Bearing launched a new division to supply bearings and related products to the wastewater Treatment industry. Michael Quinn will head the new division for the Boston-based supplier of bearings to OEM (original equipment manufacturers) and MRO (maintenance, repair and operations) markets.



Michael Quinn

## BJM Pumps names Midwest regional manager

BJM Pumps named Gary Brown Midwest regional sales manager. He replaces Chuck Emmerling who retired after 40 years with the pump industry.

## Electro Static releases AEGIS repair handbook

The AEGIS Shaft Grounding Ring Motor Repair Handbook from Electro Static Technology describes best practices for protecting motor bearings from electrical damage. The book explains how to diagnose electrical bearing damage caused by variable-frequency drives, also known as inverters. It also suggests best

practices for preventing such damage to motors of various size and horsepower. The book can be downloaded at www.est-aegis.com/bearing.

## Aqua-Aerobic celebrates 45 years

Aqua-Aerobic Systems of Loves Park, Ill., celebrates 45 years of providing products and service for the water and wastewater treatment industry. What began as a small manufacturing company in 1969 today employs 130 workers and has installed more than 80,000 Aqua-Jet surface aerators.

## Orbeco-Hellige transitions to Lovibond brand

Orbeco-Hellige, a member of the Tintometer Group, has transitioned to selling products under the Lovibond brand. Orbeco-Hellige had been selling products under the Orbeco-Hellige brand since its acquisition by Tintometer in 2006. **tpo** 



The team members are the greatest resource at this plant. They do the work. I'm support staff.I coordinate what they do, and the best way

for me to do that is to listen to what they have to say."

Nate Tillis, Operations and Maintenance Supervisor Beloit (Wis.) Water Pollution Control Treatment Facility The greatest natural resource.

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## worth noting

## people/awards

The **Henry County Water Authority** received the 2013 Collection System Gold Award from the Georgia Association of Water Professionals.

**David Green**, chief operator of the Rochester (N.H.) Wastewater Treatment Facility, and **Lorraine Sander**, superintendent of the Billerica (Mass.) Wastewater Treatment Plant, received 2013 U.S. EPA Wastewater Treatment Plant Operator Excellence Awards.

The **Pittsfield (N.H.) Wastewater Treatment Plant** received a 2013 Regional Wastewater Treatment Plant Excellence Award from the U.S. EPA.

**Ted Fafinski** of Farmington, N.Y., was named the American Public Works Association 2013 Elected Official of the Year for accomplishments including a wastewater treatment project.

The **Military Point Regional Advanced Wastewater Treatment Facility** received the 2013 Domestic Wastewater Plant Operations Excellence Award from the Florida Department of Environmental Protection.

The **DeKalb County Snapfinger Creek Wastewater Facility** earned a Safety Award from the Georgia Association of Water Professionals.

A program run by **AEP Ohio** that has helped wastewater treatment plants across Ohio cut energy use and save money received the Midwest Energy Efficiency Alliance 2014 Inspiring Efficiency Education Award.

The **Three Rivers Wastewater Treatment Plant** received the American Public Works Association 2013 Branch Award for Public Works Project of the Year for its wastewater treatment plant improvement project.

The **Salida Wastewater Treatment Facility** received the 2013 Colorado Wastewater System of the Year Award from the Colorado Rural Water Association after completion of a wastewater treatment plant overhaul, the largest capital project in city history.

The **Vallecitos Water District** in San Marcos, Calif., received the 2013 Collection System of the Year Award (small system) from the California Water Environment Association-San Diego Section.

A **Bay County (Mich.) Wastewater Treatment Plant** upgrade to increase capacity and eliminate overflows to the Saginaw River won the Eminent Conceptor Award from the American Council of Engineering Companies of Michigan.

The **Selma-Kingsburg-Fowler County Sanitation District** received these 2013 awards from the California Water Environment Association:

- Plant of the Year (medium size)
- Collection System of the Year (medium size)
- Engineering Achievement (for headworks improvement and effluent station project)
- Supervisor of the Year (Veronica Cazares, district engineer)
- Central San Joaquin Section Member Recognition Award (Jim Olinger, operator)

TPO welcomes your contribution to this listing. To recognize members of your team, please send notices of new hires, promotions, service milestones, certifications or achievements to editor@tpomag.com.

## **CALENDAR OF EVENTS**

#### June 2-4

New York Water Environment Association Spring Technical Conference and Exhibition, Hyatt Regency Hotel, Hauppauge. Visit www.nywea.org.

#### June 5-6

Canadian Biosolids and Residuals Conference, Sheraton Wall Centre, Vancouver, British Columbia. Visit www.acwwa.ca.

#### June 22-25

Michigan Water Environment Association Annual Conference, Boyne Mountain Resort, Boyne Falls. Visit www.mi-wea.org.

#### Aug. 26-29

One-Water: Ohio Water Environment Association and American Water Works Association Joint Conference, Hilton Columbus Downtown, Columbus. Visit www.ohiowea.org.

#### Sept. 8-11

WaterJAM, joint conference with the Virginia Water Environment Association and the Virginia Section of the American Water Works Association, Hampton. Call 804/332-5286 or visit www.vwea.org.

## education

#### Arkansas

The Arkansas Environmental Training Academy is offering a Class I Wastewater Seminar May 27-June 5 in Camden. Call 870/574-4550 or visit www.sautech.edu/aeta/schedule/aspx.

#### Indiana

The Alliance of Indiana Rural Water is offering these courses:

- June 24 Meeting Ammonia Limits in Lagoon Systems, Mulberry
- July 10 Lift Station Troubleshooting and Pump Service, Warsaw
- July 17 Financial Impact of Phosphorus Removal, Knox
- Aug. 28 Financial Impact of Phosphorus Removal, Roachdale
- Oct. 21 GIS Mapping, Scottsburg
- Oct. 29 Lift Station Troubleshooting and Pump Service, Indianapolis
- Nov. 6 GIS Mapping, Cloverdale
- Dec. 2 Meeting Ammonia Limits in Lagoon Systems, Shipshewana Visit www.inh2o.org.

#### Kansas

The Kansas Water Environment Association is offering these courses in Dodge City:

- June 4 Wastewater Reclamation and Reuse
- June 10 Special Topics-US and UV
- June 18 Small Wastewater Systems
- July 2 An Examination of Your Safety
- July 8 An Examination of Your Ethics
- July 10 Introduction to Water and Wastewater Conveyance
- July 15 Natural Systems for Wastewater Treatment Visit www.kwea.net.

#### Michigan

The Michigan Water Environment Association is offering these courses in

#### East Lansing:

- Sept. 11 Collections
- Oct. 29 Health and Safety
- Visit www.mi-wea.org.

#### New York

- The New York Water Environment Association is offering these courses:
- June 17 Occupational Chemical Exposure, Hopewell Junction
- July 17 Occupational Chemical Exposure, Lockport
- Oct. 23 Solids Handling and Dewatering, Babylon
- Oct. 29 Solids Handling and Dewatering, Bath

Visit www.nywea.org.

#### Virginia

The Virginia Water Environment Association is offering these following:

• June 12-13 – Operations Conference & Ops Challenge, Wintergreen

• July 28-29 – Good Laboratory Practices Workshop & Seminar, Charlottesville Call 804/332-5286 or visit www.vwea.org.

### Wisconsin

The University of Wisconsin Department of Engineering-Professional Development is offering the following courses in Madison:

- Sept. 15-17 Wastewater Treatment Processes and Technologies, Madison
- Dec. 3-5 Sanitary Sewer and Collection System Engineering, Madison Visit http://epdweb.engr.wisc.edu.

The Wisconsin Department of Natural Resources is offering the following courses:

- June 5 Advanced Wastewater Operations, River Falls
- June 12 Advanced Wastewater Operations, Burlington
- Sept. 16 Confined-Space Entry, Plover

Visit http://dnr.wi.gov. tpo



## CLASSIFIED Advertising

#### **BUSINESSES**

State-permitted private wastewater facility in Metro Atlanta. Concrete basins with sewer discharge permitted for septic and grease. Large portfolio of existing customers. Great location close to major highway in industrial park. Lots of newer equipment in place (Lab equipment, DAF, Press, Covered discharge area) and much more. 678-772-4590 or Craig@aedisposal.com (P06)

#### DEWATERING

FKC Screw Press, Class 'A'; JWC septage receiving station; Fulton boiler; Spiroflow bulk dispenser; Xerxes tanks and Gorman-Rupp pumps. For additional information contact John W. Campbell 231-547-4429 or jwc@bigfishenvironmental.com (P06)

#### EDUCATION

RoyCEU.com: We provide continuing education courses for water, wastewater and water distribution system operators. Log onto www.royceu.com and see our approved states and courses. Call 386-574-4307 for details. (oBM)

#### **POSITIONS AVAILABLE**

Seeking Asst. Operations Manager: Sewer cleaning & inspection company seeks a hands-on Asst. Operations Manager with the following skill set: Project Management, Equipment Operation & Troubleshooting, PACP certified, People Development, Safety Program, etc. We operate in the greater southeast and are based in Nashville, TN. We provide a competitive salary and full benefits. Relocation considered. Please send a resume to info@sani-techservices.com (P06)

### WATERBLASTING

Gardner Denver T-375M: Bare Shaft pump. Gardner Denver T450M Bare Shaft pump. Gardner Denver TF-375M 21 gpm @ 10,000 psi. Gardner Denver TX-450HB 21gpm @ 20,000 PSI. Gardner Denver TF-450MB 52gpm @ 10,000 psi. NLB 10-200. 34 gpm @ 10,000 psi. HT-150S 25 gpm max 10,000 psi max, Shell Side Machine, Wheatley 165: 30 gpm @ 10,000 psi. Wheatley 165: 30 gpm @ 10,000 psi. Wheatley 125 with aluminum bronze fluid end. Boatman Ind. 713-641-6006. View @ www.boatmanind.com. (CBM)

# lt's your magazine. Tell your story.

TPO welcomes news about your municipal wastewater operation for future articles:

Hearts and Minds: Your public education and community outreach efforts.
PlantScapes: Interesting features of your facility's grounds, signage or buildings.
Greening the Plant: Improvements at your facility that help the environment.
How We Do It: Interesting uses of equipment or technology.

## Send your ideas to editor@tpomag.com

Joe Guinn Wastewater Superintendent City of Decatur WWTP Decatur, TX



In the City of Decatur, TX, Wastewater Superintendent Joe Guinn and his team are dedicated to the efficient operation of the city's wastewater treatment plant. He's proud of his crew, and the hard work they put in every day at their 700,000-gpd facility. "I have the best operators in the state of Texas," boasted Joe.

## "When we needed a new belt for our filter press, you guys were right on top of it. You got us exactly what we needed."

According to Joe, one of their facility's greatest sources of pride is the condition of their filter belt press. "It takes a good operator to keep a belt press as clean as ours," he praised. While proper maintenance is critical, so is timely replacement of filter belts due to their inevitable wear and tear. "When we needed a new belt for our filter press, you guys [at USABlueBook] were right on top of it. You got us exactly what we needed, in no time at all."

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## Give your bugs an extra boost—your system will thank you! **USABlueBook** Bioaugmentation Products

Adding select bacteria to your biological wastewater system helps to maximize overall performance at reduced operating costs. These strains are created specifically for collection systems and treatment plants.

## Formula D-500

Use for better sludge settling and dewatering, control of surface foam and filamentous growth, reduction of total sludge volume, and improved plant performance. Packaged in 1/2-lb watersoluble pouches in 25-lb containers.

DESCRIPTION STOCK # D-500A for Large Plants 45044 \$ 281.95 D-500C for Smaller Plants 45046



EACH

281.95

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Reduces grease and sulfides in sewers and lift stations, lowers maintenance costs for grease control, reduces sewer corrosion while improving sewer flow, and increases pump life. Packaged in 1/2-lb water soluble pouches in 25-lb containers.

DESCRIPTION STOCK # EACH D-220 45042 \$ 281.95



## Formula Nitro

Use for fast compliance and ammonia control. This formula removes ammonia, nitrite and nitrate, using selected strains of Nitrosomonas spp and Nitrobacter spp that function over a widerthan-normal range of pH values.

STOCK #	EACH
46953	\$ 131.95
46954	594.95
46955	6,135.95
	STOCK # 46953 46954 46955



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For more information, including recommended dosing schedules, see page 1653 in USABlueBook Catalog 125.